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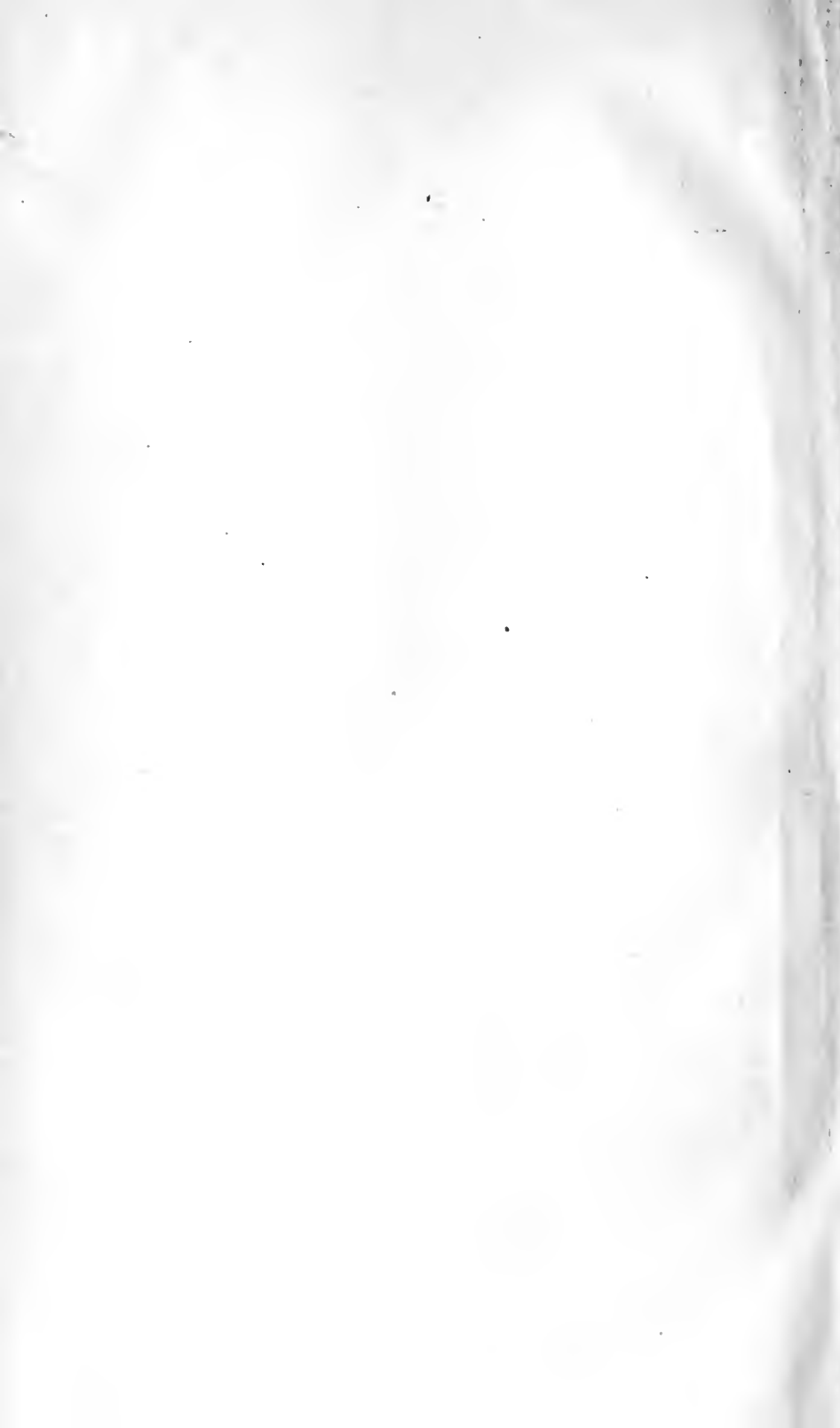
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No. 1



JANUARY, 1900

SAN FRANCISCO, CAL.

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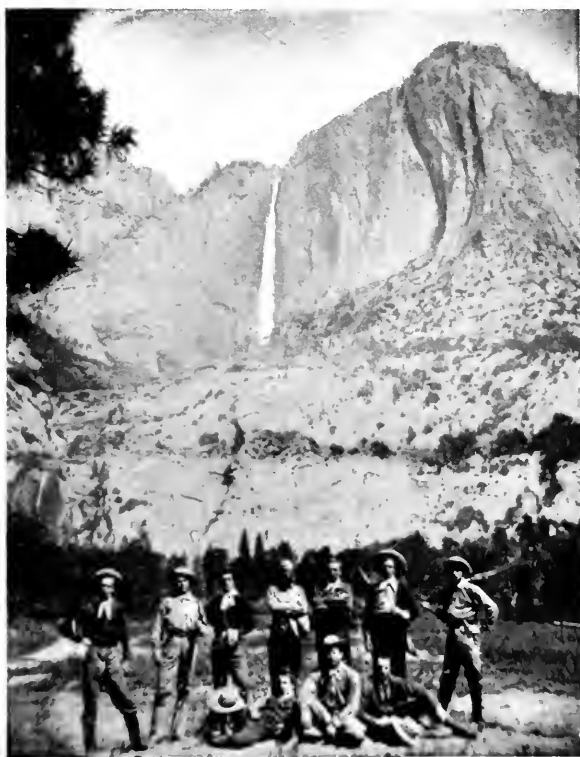
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All communications intended for publication by the SIERRA CLUB, and all correspondence concerning such publication, should be addressed to the Editor, Elliott McAllister, 206 Sansome Street, San Francisco, California.

Correspondence concerning the distribution and sale of the publications of the Club, and concerning its business generally, should be addressed to the Secretary of the Sierra Club, Merchants' Exchange Building, San Francisco, California.





PHELPS. BOLTON. PERKINS. PROF. LE CONTE. SOULÉ. LINDERMAN. COBB.
STONE. HAWKINS. POMROY.

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SIERRA CLUB BULLETIN.

VOL. III.

SAN FRANCISCO, JANUARY, 1900.

NO. I.

RAMBLINGS THROUGH THE HIGH SIERRA.*

BY JOSEPH LE CONTE.

PREFACE TO ORIGINAL EDITION.

About the first week before the end of the First Session of the University of California, several young men, students of the University, invited me to join them in a camping party for the Yosemite and the High Sierra. The party was to go in regular pioneer style, cooking their own provisions, and sleeping under the open sky whenever a convenient place was found; each man was to bestride his own horse, carry his own bedding behind his saddle, and his clothing, with the exception of one change of underwear, on his back.

This was, it is true, a little rougher and harder than anything I had ever undertaken; but still I was fond of adventure, and longed to enjoy the glories of Yosemite and the beauties of the Sierra, and, more than all, to study mountain structure and mountain sculpture, as exhibited there on a magnificent scale. I therefore at once accepted the offer. The party was forthwith organized, ten in number. Mr. Hawkins, who understood something of mountain life, was commissioned to buy the necessary supplies, and the general outfit, such as camp utensils, pack-horse and pack-saddle, and have all in readiness that we might start the very first day after commencement.

To while away my idle moments in camp, and to preserve some *souvenir* of the party, of the incidents, and of the scenery, I jotted down, from time to time, these wayside notes. J. L'C.

JULY 21, 1870.—Amid many kind and cheering words, mingled with tender regrets; many encouragements, min-

* Reprinted from "A Journal of Ramblings," privately printed in 1875.

gled with earnest entreaties to take care of myself, and to keep out of *drafts* and *damp* while sleeping on the *bare ground* in the *open air*; many half-suppressed tears, concealed beneath bright smiles, I left my home and dear ones this morning. Surely I must have a heroic and dangerous air about me, for my little baby boy shrinks from my rough flannel shirt and broad-brim hat, as did the baby son of Hector from *his* brazen corslet and beamy helm and nodding plume. I snatch a kiss and hurry away to our place of rendezvous.

After much bustle, confusion, and noisy preparation, saddling, cinching, strapping blanket rolls, packing camp utensils and provisions, we are fairly ready at 10 A. M. Saluted by cheers from manly throats, and handkerchief-wavings by the white hands of women, we leave Oakland at a sweeping trot, Hawkins leading the pack; while the long handle of our frying-pan, sticking straight up through a hole in the bag, and the merry jingling of *tin* pans, *tin* cups and coffee-pot — “tintinabulation” — proclaimed the nature of our mission.

We are in high spirits; although I confess to some misgivings when I heard from the Captain that we would ride thirty miles to-day, for I have not been on horseback for ten years. But I am determined not to be an incumbrance to the merry party. We started from Oakland seven in number. One will join us to-night in Livermore Valley. Two others, having gone to Stockton to procure horses, will join us at Graysonville. Without any remarkable incident we rode along the level plain which borders the bay about fifteen miles, and reached our lunch-ground near Hayward, at 1 P. M. Here we fed our horses and rested two hours.

Started again at 3 P. M. Our ride took us over the Contra Costa Ridge, by Hayward Pass, into Amador and Livermore Valleys, and then along these valleys, the noble

outline of Mt. Diablo looming finely in the distance on our left. I observe everything narrowly, for all is new to me, and so different from anything in the Eastern States. Livermore Valley is an extensive, rich, level plain, separating the Contra Costa from the Mt. Diablo Ridge. It is surrounded by mountains on every side, and the scenery is really fine. Much pleased to find the mountains, on their northern and eastern slopes, so green and well wooded. I have been accustomed to see them from Oakland only on their southern and western slopes, which are almost treeless, and, at this season, brown and sere. Much interested in watching the habits of burrowing squirrels and burrowing owls, especially the amicable manner in which they live together in the same burrows.

After riding about ten miles, we arrived, a little before sunset, at Dublin, a little village of a few houses. Here we found tolerable camping-ground, and ought to have stopped for the night; but, against my advice, the party, buoyant and thoughtless, concluded to go on to Laddsville,* where one of the party would join us, and had promised to prepare forage for our horses and camp for ourselves. It was a foolish mistake. From this time our ride was very tedious and fatiguing. The miles seemed to stretch out before us longer and longer. The hilarious and somewhat noisy spirits of the young men gradually died away. After some abortive attempts at a song, some miserable failures in the way of jokes, we pursued our weary way in silence. Night closed upon us while we were still many miles away from Laddsville. Lights ahead! Are these Laddsville? We hope so. Onward we press; but the lights seem to recede from us. Still onward, seemingly three or four miles; but no nearer the lights. Are these *ignes fatui* sent to delude us? But courage! here comes some one. "How far to Laddsville?" "Three miles."

* This place is now called Livermore.

Onward we pressed, at least three miles. Again a wayfarer. "How far to Laddsville?" "Three and a half miles." Again three or four miles onward; three or four miles of aching ankles and knees, and hips and back, but no complaint. "How many miles to Laddsville?" "Five." Again three or four miles of aching knees and hips and back. Wayfarers are becoming more numerous. "How far to Laddsville?" "Two miles." "How far to Laddsville?" "A little over a mile." "How far to Laddsville?" "How far to Laddsville?" — "To Laddsville?" — Ah! here it is at last. Yes, at last, about 10 P. M., that now celebrated place was actually reached; but too late for good camping. The companion who was to join us here was nowhere to be found. We hastily made arrangements for our horses in a neighboring stable, and camped on the bare, dusty ground, in an open space on the outskirts of the town. A good camp-fire and a hearty meal comforted us somewhat. About 11:30 P. M. rolled ourselves in our blankets and composed ourselves for sleep.

To our wearied spirits, we seem to have traveled at least fifty miles to-day. From the most accurate information we can get, however, the actual distance is only about thirty-five miles. Very foolish to go so far the first day.

JULY 22. — Estimating the whole mammalian population of Laddsville at two hundred, I am sure at least one hundred and fifty must be dogs. These kept up such an incessant barking all night, around us and at us, as we lay upon the ground, that we got little sleep. Near daybreak I sank into a deeper, sweeter sleep, when whoo!—oo—oo—oo—! whoo!!! the scream of a railroad train, passing within fifty feet, startled the night air and us. It is not surprising, then, that we got up reluctantly, and rather late, and very stiff and sore. Our breakfast, which consisted this morn-

ing of *fried bacon, cheese, cold bread, and good tea*, refreshed and comforted us greatly. While eating our breakfast, whoop! whoop! hurrah! our expected companion, Dell Linderman, came galloping in, with gun slung on shoulder. He did his best, by whip and spur and noise, to make a dashing entry, but his heavy, sluggish mare did not in the least sympathize with his enthusiasm. He had been looking for us the evening before, but had given us up, and went back to a friend's house, a little out of Laddsville.

Soon after sunrise, all the inhabitants of Laddsville, including, of course, the one hundred and fifty dogs, came crowding around us; the men to find out who we were, and where bound; the dogs to find out what it was they had been barking at all night. After we had severally satisfied these, our fellow-creatures, both biped and quadruped—our fellow-men and Darwinian cousins—we saddled and packed up, determined to profit by the experience of yesterday, and not to go more than twenty miles to-day. Our horses as well as ourselves have suffered from the travel of yesterday. We started late, about 8 A. M., proceeded only five miles, and stopped, 10 A. M., under the shade of a clump of oaks, near a mill. The air is still this morning, and the sun insufferably hot. We here took cold lunch, and rested until 1 P. M. A cool breeze now springing up, we started, passed over the summit of Corral Hollow Pass and down by a very steep grade, I think about fifteen hundred feet in a mile, into "Corral Hollow," a very narrow cañon with only fifty to sixty yards width at the bottom, with high rocky cliffs on either side, which cuts through Mt. Diablo Range to the base. The road now ran in this cañon along a dry stream bed for many miles, until it finally emerges on the San Joaquin plains.

In Amador and Livermore Valleys, I observed the soil was composed of a drift of rounded pebbles, in stiff adobe clay—local drift from the mountains. In Corral Hollow the

soil consists of pebbles and coarse sand, evidently river deposit. Fine sections showing cross lamination were observed. Mountains very steep on each side the gorge. Perpendicular cliffs of sandstone and limestone exposed in many places, sometimes worn into fantastic shapes, and often into caves. These caves, I hear, were once the haunts of robbers. Near the bottom of the gorge the irregularly stratified river sands are seen lying unconformably on the sandstone. We passed on our way some coal mines, which are now worked. These strata are probably cretaceous, belonging to the same horizon as the Mt. Diablo coal.

We rode ten or twelve miles down Corral Hollow, or about fifteen miles, this afternoon, and camped, 7 P. M., at a teamsters' camp, the permanent camp of the teamsters of the coal-mine. From these men we bought feed for our horses; then cooked supper, and went to bed as early as possible.

JULY 23.—The whole party woke up this morning in good spirits, much refreshed by our supper and sleep last night. We got up at 4 A. M., cooked our breakfast and were off by 5:30. At first we really enjoyed our ride in the cool morning air. In about an hour we emerged from Corral Hollow on the San Joaquin plains. There is still a fine cool breeze. "Why, this is delightful; the San Joaquin plains have been much slandered," thought we. As we advanced, however, we changed our opinion. Insufficiency of rain last winter has produced utter failure of crops. As far as the eye can reach, in every direction, only a bare desert plain is seen. The heat now became intense; the wind, though strong, was dry and burning. Over the perfectly level, dry, parched, dusty, and now desert plains, with baked lips and bleeding noses, we pressed on toward Grayson, where we expected to noon.

"Grayson is on the San Joaquin River. It can't be far off, for yonder is water." Yes, surely yonder is water; do you not see its glistening surface? its rolling billows running in the direction of the wind? the reflection of the trees, which grow on the *farther* bank? Those white objects scattered over the glistening surface, with their images beneath: are these not sails on the river? Alas! no! It is all mirage. There is no water visible at all. The trees are trees which skirt the *nearer* bank of the river; the white objects are cottages on the desert plains. We could hardly believe it until we were deceived and undeceived half a dozen times. Parched with heat and thirst, and blinded with dust, we could easily appreciate the tantalizing effect of similar phenomena on the thirsty travelers of Sahara.

Onward, still onward, with parched throats, baked lips, and bleeding noses, we press. But even with parched throat, baked lips, and bleeding nose, one may enjoy the ludicrous, and even shake his gaunt sides with laughter; at least I found it so this morning. The circumstances were these: Hawkins early this morning killed a rabbit. Phelps, conceiving the idea that it would relish well, broiled on the glowing coals of our camp fire to-night, offered to carry it. He did so for some time, but his frisky, foolish, unsteady filly, not liking the dangling rabbit, became restive, and the rabbit was dropped in disgust, and left on the road. Stone, good-natured fellow, in simple kindness of heart, and also having the delights of broiled rabbit present in his imagination—the *picture* of broiled rabbit before his *mind's eye*, and the *fragrance* of broiled rabbit in his *mind's nose*—dismounted and picked it up. But essaying to mount his cow-like beast again, just when he had, with painful effort, climbed up to his "saddle's eaves," and was about to heave his long dexter leg over and wriggle himself into his seat, the beast aforesaid, who had been attentively viewing the operation out of the external corner of his left eye,

started suddenly forward, and Stone, to his great astonishment, found himself on *his own* instead of his horse's back. Then commenced a wild careering over the dusty plain, with the saddle under his belly; a mad plunging and kicking, a general chasing by the whole party, including Stone himself, on foot; a laughing and shouting by all except Stone, until cinch and straps gave way, and saddle, blanket-roll, and clothing lay strewn upon the ground.

We had hardly picked up Stone's traps, and mended his cinch, and started on our way — the agitation of our diaphragms and the aching of our sides had hardly subsided — when Pomroy, sitting high-enthroned on his aged, misshapen beast, thinking to show the ease and grace of his perfect horsemanship, and also secretly desiring to ease the exquisite tenderness of his sitting-bones, quietly detached his right foot from the stirrup and swung it gracefully over the pommel, to sit a while in woman-fashion. But as soon as the shadow of his great top-boots fell across the eyes of "Old 67," that venerable beast, whether in the innocence of colt-like playfulness, or a natural malignancy, made frantic by excessive heat and dust, began to kick and plunge and buck, until finally, by a sudden and dexterous arching of his back, and a throwing down of his head, Pomroy was shot from the saddle like an arrow from a bow or a shell from a mortar; and sailing through mid-air with arms and legs widely extended, like the bird of Jove, descended in graceful parabolic curve and fell into the arms of his fond mother earth. Unwilling to encounter the wrath of his master, Old 67 turned quickly and fled, with his mouth wide open, and his teeth all showing, as if enjoying a huge horse-laugh. Then commenced again the wild careering on the hot plains, the mad plunging and kicking, the shouting and laughing and chasing. The horse at last secured, Pomroy took him firmly by the bit, delivered one blow of his clenched fist upon his nose, and then gazed

at him steadily with countenance full of solemn warning. In return, a wicked, unrepentant, vengeful gleam shot from the corner of the deep-sunk eye of Old 67.

Onward, still onward, over the absolutely treeless and plantless desert, we rode for fifteen or more miles, and reached Grayson about 12 M. Here we nooned and rested until 4 P. M. Two of our party, viz., Cobb and Bolton, joined us here from Stockton, where they had gone to procure horses. While resting here, we took a delightful swim in the San Joaquin River. Delightfully refreshing while in the water; but on coming out, the wind felt as hot and dry and fiery as if it blew out of a furnace. Caught a few fish here, and enjoyed them for lunch. Bought some peaches, and devoured them with a kind of ravenous fierceness. Ah! how delicious in this parched country!

Grayson is a small, insignificant village, with a half-dozen or more buildings, among which there is, of course, the hotel and the post-office. I took advantage of the latter to send off a letter to my wife—a very short letter—assuring her of my health, and that I was doing as well as could be expected; indeed, much better.

Four P. M., crossed the ferry, and continued on our journey about eight or ten miles, and camped for the night at Mr. Dooly's ranch. Here we found much kindness in Mr. Dooly, much fodder for our horses, a big straw-bank for our beds, and a blue, starry sky for our roof. There was no reason, therefore, why we should not be happy. We were so; indeed, we really enjoyed our supper and our beds.

The San Joaquin plains, though the most fertile part of the State, is at this time, of course, completely dry and parched; nothing green as far as the eye can reach, except along the river banks. The crops this year have to a great extent failed, on account of the insufficient rain of the last rainy season. The only animate things which enlivened

the scene this afternoon were thousands of jack-rabbits and burrowing squirrels, and their friends, the burrowing owls.

JULY 24, SUNDAY.—*The day of rest.* Rest on the San Joaquin plains! Impossible! We pushed on this morning—this delightful, cool Sunday morning—after a refreshing night's rest. Cool in the morning, but hot, oh! how hot! as the day advanced. Made fifteen miles, and nooned at a large ranch—Mr. Ashe's. Besides the invariable jack-rabbits, burrowing squirrels, and burrowing owls, I noticed thousands of horned frogs (*Phrynosoma*). I observed here a peculiarity of California life. Mr. Ashe is evidently a wealthy man. His fields are immense; his stables and barns are very ample; his horses and hired laborers are numerous; great numbers of cows, hogs, turkeys, chickens—every evidence of abundance, good living, and even of wealth, except dwelling-house. This is a shanty, scarcely fit for a cow-house. He does n't live here, however, but in San Francisco.

I saw also, to-day, a badger. One of the party tried to shoot him, but he disappeared in a burrow.

To-day has been insufferably hot. We find, upon inquiry, that there is a house at which we may stop, seven miles from this. We concluded to rest until the cool of the evening. We drowse away several hours under a wagon-shed, and resume our journey, 5:30 P. M. On the way this evening we killed two rattlesnakes, one with eight and one with twelve rattles. Enjoyed greatly the evening ride, and the glorious sunset. About dark reached the house where we expected to camp; but, alas, no feed for horses. Directed to another house, two or three miles farther on. They must have feed there, for it is a *stage station*. On we went in the dark, over an exceedingly rough plowed field, full of great adobe clods, and reached the house, tired and

hungry, about 9 P. M. Again "No feed." We were in despair. Impossible to go farther. "Any other house?" "None within seven or eight miles." When we spoke of going on, however, the man in charge (agent) hinted at the existence of a barley-stack. "That's just what we want." "But can't let you have it." He was evidently trying to extort from us in our necessity. This made Soulé, our Captain, so angry that he plainly told him that we would have the use of the stack, and he might get redress in any way he liked. A good deal of useless cursing passed on both sides, when, by word of command, we marched off to the stack, about one quarter mile distant, and picketed our horses around, with their heads to the stack. It was already so late that we did not attempt to cook supper, but ate it cold. After our cold supper, we threw ourselves upon the stack, and, although late, gazed up into the clear black sky, studded with brilliant stars, and talked for more than an hour. The young men asked me many questions about stars, and nebulæ, and spectrum analysis, and shooting-stars, and meteoric stones, which led to quite a dissertation on these subjects. The time and circumstances gave a keener interest to the discussion.

On San Joaquin plains, and, I believe, everywhere in California, however hot the days may be, the nights are delightfully cool.

JULY 25.—After a really fine night's rest, we got up about 4 A. M. The day was just breaking, and the air very clear and transparent. The blue, jagged outline of the Sierra is distinctly and beautifully marked, above and beyond the nearer foot-hills, against the clear sky. In fact, there seemed to be several ridges, rising one above and beyond the other; and above and beyond all, the sharp-toothed summits of the Sierra. Took, again, a cold breakfast, and made an early start, 5 A. M. Went up to the house and

offered to pay the agent for the barley. Charged us twenty-five dollars! We had been charged for the same everywhere else three dollars. Went into the house. Spoke to the ladies (daughters of the owner) on the subject. They were very kind and pleasant, and well satisfied with three dollars. We therefore paid them and left.

At first, our ride was delightfully pleasant in the cool morning; but gradually the bare desert plains, now monotonously rolling, became insufferably hot and dusty. The beautiful view of the Sierra, the goal of our yearnings, gradually faded away, obscured by dust, and our field of vision was again limited by the desert plains. Soon after leaving the plains, we stopped for water at a neat hut, where dwelt a real "*old mammy*," surrounded by little darkies. On inquiry I found she was from Jackson County, Georgia, and formerly owned by a Mr. Strickland. She had come to California since the war. I was really glad to see the familiar old face, and hear the familiar low-country negro brogue; and she equally glad to see me. She evidently did not like California, and seemed to pine after the "*auld country*." From this place to Snelling the heat and dust was absolutely fearful. We are commencing to rise; there is no strong breeze, as on the plains; the heated air and the dust rise from the earth and envelop us, man and horse, until we can scarcely see each other. After about fifteen miles travel, arrived at Snelling at 11:30 A. M. Here we washed ourselves thoroughly, and took a good meal at the hotel, the first meal we have thus taken since leaving Oakland. We heartily enjoyed both the cleansing and the meal.

Snelling is the largest and most thriving village we have yet seen. It is in the midst of a fine agricultural district. It supplies the mining district above, without itself being entirely dependent upon that interest. Pleased to notice a very nice brick public schoolhouse. The population is

probably six or seven hundred. Observed many Chinese laborers, hostlers, waiters, etc.

Continued our ride, 4 P. M., expecting to go only to Merced Falls to-night. Country beginning to be quite hilly: first, only denudation hills of drift, finely and horizontally stratified; then, round hills, with sharp, toothlike jags of perpendicularly-cleaved slates, standing out thickly on their sides. Here we first saw the auriferous slates, and here, also, the first gravel diggings. The auriferous gravel and pebble deposit underlies the soil of the valleys and ravines. About five miles from Snelling we forded the Merced River. Here were two roads, one along the river and the other over the hills. Two of the young men, Pomroy and Bolton, took the road over the hills; the rest of us thought that along the river the right one. Called after the other two to return, but they thought they were right, and proceeded. Went down the river about one-half mile below the fall, and camped. About one hour after dark, Pomroy and Bolton returned, and joined us at supper. No straw-bank for bed to-night. On the contrary, we camped on the barest, hardest, and bleakest of hills, the wind sweeping up the river over us in a perfect gale. Nevertheless, our sleep was sound and refreshing.

I heard to-night, for the first time, of a piece of boyish folly — to call it nothing worse — on the part of some of the young men, at Ashe's, yesterday noon. While I was dozing under the shed, some of the young men, thinking it, no doubt, fine fun, managed to secure and appropriate some of the poultry running about in such superfluous abundance in the yard. While sitting and jotting down notes under the wagon-shed there, I *had* observed Cobb throwing a line to some chickens. When I looked up from my note-book, I did observe, I now recollect, a mischievous twinkle in his coal-black eye, and a slight quiver of his scarcely perceptible downy moustache, but I thought nothing of it. Soon

after I shut up my note-book, and went under a more retired shed to doze. It now appears that a turkey and several chickens had been bagged. The young rascals felicitated themselves hugely upon their good fortune, but, unfortunately, last night and this morning we made no camp-fire, and to-day at noon we ate at the hotel table; so that they have had no opportunity of enjoying their ill-gotten plunder until now.

Captain Soulé and myself have already expressed ourselves briefly, but very plainly, in condemnation of such conduct. To-night the chickens were served. I said nothing, but simply, with Soulé and Hawkins, refused the delicious morsel, and confined myself to bacon.

Merced Falls is a small village, deriving its importance only from a large mill situated on a rapid of the same name.

JULY 26.—Really feel quite vigorous and refreshed this morning. Got up at 4:30 A. M. Again refused fat chicken and turkey, though sorely tempted by the delicious fragrance, and ate bacon and dried beef instead. The young men have keenly felt this quiet rebuke. I feel sure this thing will not occur again. Rode, without any remarkable incident, fifteen miles this morning, to the toll-house, on the top of a high ridge. Here we nooned, fed our horses, and rested until 4 P. M. The country is becoming mountainous; we are rising the foot-hills. The soil begins to be well wooded. The air, though still hot, is more bracing. Small game is more abundant. I have become inured to the exercise of riding, and begin really to enjoy the trip. We are now on the famous Mariposa Estate. We have, all along the road to-day, seen abundant evidence of mining, prospecting, etc., but all abandoned. While at the toll-house, the young men amused and refreshed themselves by bathing in the horse-trough. It was really a fine bathing-tub, being about thirty feet long, two feet wide, and two

feet deep, and a fine stream of water running through it. We really had a pleasant time here. Nevertheless, every joy has its corresponding sorrow. We here lost the bag containing our *cheese* and *bacon*. How it disappeared is, and probably always will be, a mystery. There are many hounds about the premises; this may furnish a key to the investigator.* The keeper of the toll-house is a rich character, a regular *Paddy*, full of fun and humor.

About 4:30 P. M. started for Mariposa, twelve miles distant. Enjoyed greatly the evening ride. Passed through the decayed, almost deserted, village of Princeton. Witnessed a magnificent sunset; brilliant golden above among the distant clouds; nearer clouds purple, shading insensibly through crimson and gold into the insufferable blaze of the sun itself. Camped near an inn, where we could buy feed for our horses, one and one-half miles from Mariposa. Unfortunately, no straw-bank here, but we must lie on the hard, very hard, ground. Our bacon and cheese being lost, it is fortunate that we killed to-day several rabbits, quails, doves, etc., which we enjoyed at supper.

JULY 27. — After a refreshing night's rest and a hearty breakfast, we started at 6:30 A. M., and created some excitement in the town of Mariposa, by riding through the streets in double file, military-fashion, and under word of command. The Captain was in his glory, and his horse seemed to sniff the battle. Dismounted at grocery-store and bought supplies. Mariposa is now greatly reduced in population and importance. It contains from five to six hundred inhabitants, but at one time two or three times that number. The same decrease is observable in all the mining towns of California. Noticed many pleasant

* Just two years after this event I again with a party passed over this road and camped over night at this place. The hounds were still there, and we again lost our bacon. This is an additional fact in favor of the *hound theory*.

evidences of civilization: church-spires, water-carts, fire-proof stores, etc.

After about an hour's detention in Mariposa, we rode on. A little way out of town, we stopped to examine a quartz-mill. It is about forty horse-power. In the narrow, confined valleys of the foot-hills, the air is comparatively still, and the heat and dust is very great. Both horses and men very much worried by a march, this morning, of only fourteen miles. I have felt the ride much more to-day than yesterday. Stopped for noon meal at De Long's (near White & Hatch) half-way house from Mariposa to Clark's.

In order to avoid the heavy toll on the finely graded road to Clark's, we determined to take the very rough and steep trail over the Chowchilla Mountain, which now rose before us. My advice was to start at 3 P. M., for I still remembered Laddsville and the stage station, but the rest of the party thought the heat too great. The event proved I was right. Started 4:30 P. M. We found the trail much more difficult than we expected (we had not yet much experience in mountain trails). It seemed to pass directly up the mountain, without much regard to angle of declivity. In order to relieve our horses, we walked much of the way. Two of the party, Linderman and Cobb, stopped to refresh themselves at a deliciously cool spring. We gave them minute directions concerning the trail, and proceeded. We saw no more of them. The trail passes directly over the crest of the mountains, and down on the other side. Night overtook us when about half down. No moon; only starlight. The magnificent forests of this region, consisting of sugar-pines, yellow pines, and Douglass firs (some of the first eight to ten feet in diameter, and two hundred and fifty feet high) — grand, glorious by daylight; still grander and more glorious in the deepening shades of twilight; grandest of all by night — increased the darkness so greatly that it was impossible to see the trail. We gave the horses the

reins, and let them go. Although in serious danger of missing footing, I could not but enjoy the night ride through those magnificent forests. These grand old trunks stand like giant sentinels about us. Were it not for our horses, I would gladly camp here in the glorious forest. But our tired horses must be fed. Down, down, winding back and forth; still down, down, down, until my back ached and my feet burned with the constant pressure on the stirrups. Still down, down, down. Is there no end! Have we not missed the trail? No Clark's yet. Down, down, down. Thus minute after minute, and, it seemed to us, hour after hour, passed away. At last the advanced guard, Hawkins, gave the Indian yell: See lights! lights! The whole company united in one shout of joy. When we arrived it was near 10 P. M. It being so late, we did not cook supper, but took supper at Clark's. Supper over, we turned our horses into Clark's meadow; selected our camp-ground, in a magnificent grove of pines one hundred and fifty to two hundred feet high; rolled ourselves in our blankets, and slept, with the mournful sighing of the pines as our lullaby.

We have felt some anxiety on account of the young men we left on the trail. After arriving at Clark's we shot off our guns and pistols, to attract their attention, thinking they might be lost on the mountains. We hope they will come in to-morrow. We killed another large rattlesnake to-day on the Chowchilla trail.

JULY 28.—The missing men, Linderman and Cobb, came in this morning, about 10 A. M. They had missed the trail, wandered over the mountains, reached a mountaineer's hut, been cordially received, slept over night, and been directed on their road to Clark's, this mornig. Our party is complete again. Our trip, thus far, has been one of hardship without reward. It has been mere endurance, in the hope of enjoyment. Some enjoyment, it is true,—

our camps, our morning and evening rides, our jokes, etc., —but nothing in comparison with the dust and heat and fatigue. From this time we expect to commence the real enjoyment. We are delightfully situated here at Clark's; fine pasture for horses; magnificent grove of tall pines for camp; fine river—South Fork of Merced—to swim in; delightful air. We determined to stop here two days; one for rest and clothes-washing, and one for visiting the Big Trees. I have been sufficiently long with the party to become well acquainted with all. I have nothing to do, to-day, except to wash my clothes. I cannot have a better opportunity to describe our party. I do it very briefly.

We are in ten in number. Each man is dressed in strong trousers, heavy boots or shoes, and loose flannel shirt; a belt, with pistol and butcher-knife, about the waist; and a broad-brimmed hat. All other personal effects (and these are made as few as possible) are rolled up in a pair of blankets and securely strapped behind his saddle. Thus accoutered, we make a formidable appearance, and are taken sometimes for a troop of soldiers, but more often for a band of cattle or horse drovers. Our camp utensils consist of two large pans, to mix bread; a camp-kettle, a teapot, a dozen tin plates, and ten tin cups; and most important of all, two or three frying-pans. The necessary provisions are bacon, flour, sugar, tea, and coffee. Whenever we could, we bought small quantities of butter, cheese, fresh meat, potatoes, etc. Before leaving Oakland we organized thoroughly, by electing Soulé as our Captain, and Hawkins his Lieutenant, and promised implicit obedience. This promise was strictly carried out. All important matters, however, such as our route, how long we should stay at any place, etc., was decided by vote, the Captain preferring to forego the exercise of authority in such matters.

The names and descriptions of the members of the party are as follows:—

1. *Capt. Frank Soulé.*—Strong, well-formed and straight, with clear-cut features and handsome face. Mounted on a tall, raw-boned, high-stepping dappled-gray, with a high head, a high spirit and fine action, he presents a striking appearance. He evidently feels his rank, and so does his horse. As to the latter

“We shall not need to say what lack
Of leather was on his back,
For that was hidden under pad,
And breech of Knight, galled full as bad.”

2. *Lieut. Leander Hawkins.*—Strong, thick-set, almost herculean in build. Mounted on a fierce, vicious Indian pony, as wild as a deer, which he rides with a rope around his nose, instead of a bridle, and a blind across the forehead, which may be slipped over the eyes at a moment's notice; he is evidently a most fearless rider and horse-breaker. He is, besides, thoroughly acquainted with camp life and mountain life. He is, therefore, the most indispensable man in the party. At first he did everything; but he has gradually taught us the mysteries of cooking, dishwashing, and, above all, packing a horse. He is also treasurer and commissary, and always rides ahead, toward evening, and selects camp-ground. Generous almost to a fault, he is ever ready to help every one, and really does more work than any three in the party.

3. *Myself.*—Long and lean and lantern-jawed, and in search of romantic adventure, I was sometimes called by Linderman, but very secretly, “Don Quixote.” I accept the nickname with pleasure, perhaps with pride. I have a great respect for the old Don. There was nothing remarkable about my horse. A strong, tough, well-made gray, both gentle and careful, he was admirably suited for my purposes. My function in the party was that of surgeon and scientific lecturer.

4. *Everett B. Pomroy.*—Short, strong, compact, mus-

cular, with high roman nose, close-cropped hair, and coarse top-boots; very erect, somewhat grandiose in appearance and stilted in language. 'He is called "Our Poet."' He is "A chiel amang us, takin' notes, and faith he'll prent it." He is mounted on a large mud-colored mustang, with a broad, flat head, deep-sunk, vicious eyes, and a sprung knee. He stumbles fearfully, and bucks whenever he can, but is a tough, serviceable beast, nevertheless. We call him "Old 67," from a brand on his thigh. Pomroy sits astride of this ill-favored, hobbling beast, majestic and solemn, like Jupiter Tonans shorn of his ambrosial locks.

5. *Dell Linderman*.—Full of wit and infinite humor, quick and unfailing at repartee, with a merry twinkle in his eye, and a humorous, reddish knob on the end of his nose. We call him "Our Jester." He keeps our table in a roar. All the nicknames of men and horses are of his invention. His own horse is a very stout, logy mare, with a very rough gait. He calls her "Dolly Ann, the Scab-grinder." A gun, slung over his shoulder, completes his equipment.

6. *George Cobb*.—Full of life and spirit, mercurial in temperament, with small, merry, coal-black eyes, and mouth always laughing and always chattering. He rides a neat, trim, round, frisky little mare, which seems well suited to him. He carries a splendid repeating rifle, with which he often shoots at *marks*. He is not known to have hit any living thing. He wears, also, neat strapped leggings. He is the fancy man and amateur sportsman of the party.

7. *Jack Bolton*.—Dark, grave, quiet; he rides a strong-boned, steady-going, grave-looking horse, of excellent gait and qualities.

8. *Charles Phelps*. Slender, long-limbed, loose-jointed, gothic in structure of body and features, Linderman calls him "Kangaroo." His horse is a thin, slender-limbed, weak-looking mare, which in walking wobbles its hinder

parts in a serpentine manner. On each side of his unsteady beast Phelps' long legs dangle in a helpless manner.

9. *Charles Stone*.—Tall, erect; very long, curved nose; very long, straight legs, and very high hips. Linderman calls him sometimes "Crow," from his nose, and sometimes "Tongs," from his legs. His horse is a pinto iron-gray; with whitish, imbecile-looking eyes, head down, nose stuck forward, and a straddling, cow-like action of his hind legs in trotting. A tough, serviceable beast withal, except that it is impossible to cinch a saddle on his cow-like form so tightly that it will not slip on his neck in going down hill. Linderman calls him "Samson Nipper"; why, I cannot tell; but the name seems to us all very expressive.

10. *Jim Perkins*.—A neat, trim figure, both active and strong; a fine face, with well-chiseled features; quiet, unobtrusive, gentlemanly. He was mounted on a compact, well-built horse, of excellent gait and qualities.

11. Last, but not least, is "*Old Pack*," as we call our pack-horse. A mild-eyed, patient, much-enduring beast, steady and careful, with every quality befitting a pack-horse. We all conceived a great affection for him.

Our party was divided into three squads of three each, leaving out Hawkins, as he helped everybody, and had more duties of his own than any of the rest. Each squad of three was on duty three days, and divided the duties of *cook*, *dishwasher*, and *pack* among themselves. On arriving at our camp-ground, each man unsaddled and picketed his horse with a long lariat rope carried on the horn of his saddle for this purpose. In addition to this, whoever attended to the pack-horse that day, unpacked him, laid the bags ready for the cook, and picketed the pack-horse. The cook then built a fire (frequently several helping, for more expedition), brought water and commenced mixing dough and baking bread. This was a serious operation to make bread for ten, and bake in two frying-pans.

First, the flour in a big pan; then yeast-powder; then salt; then mix dry; then mix with water to dough; then bake quickly; then set up before the fire to keep hot. Then use frying-pans for meat, etc. In the mean time, the *dishwash* must assist the cook by drawing tea or coffee. Our first attempts at making bread were lamentable failures. We soon found that the way to make bread was to bake from the top as well as the bottom; in fact, we often baked entirely from the top, turning it over by flipping it up in the frying-pan, and catching it on the other side. Bake them as follows: Spread out the dough to fill the frying-pan, one-half inch thick, using a round stick for rolling-pin and the bottom of bread-pan for biscuit-board; set up the pan, at a steep incline, before the fire, by means of a stick. It is better, also, to put a few coals beneath, but this is not absolutely necessary.* It is the duty, now, of the *dishwash* to set the table. For this purpose a piece of Brussels carpet (used during the day to put under the pack-saddle, but not next to the horse) is spread on the ground, and the plates and cups are arranged around. The meal is then served, and each man sits on the ground and uses his own belt-knife, and fork, if he has any. After supper we smoke, while Dishwash washes up the dishes; then we converse or sing, as the spirit moves us, and then roll ourselves in our blankets, only taking off our shoes, and sleep. Sometimes we gather pine straw, leaves, or boughs, to make the ground a little less hard. In the morning, Cook and Dishwash get up early, make the fire, and commence the cooking. The rest get up a little later, in time to wash, brush hair, teeth, etc., before breakfast. We usually finish breakfast by 6 A. M. After breakfast, again wash up dishes and put away things, and deliver them to Pack, whose duty it is then to pack the pack-horse, and lead it during the day.

* This account of bread-making anticipates a little. At this time we had not yet learned to make it palatable.

We could travel much faster but for the pack. The pack-horse must go almost entirely in a walk, otherwise his pack is shaken to pieces, and his back is chafed, and we only lose time in stopping and repacking. By organizing thoroughly, dividing the duties and alternating, our party gets along in the pleasantest and most harmonious manner. After this description, I think what follows will be understood without difficulty.

Soon after breakfast this morning, Professors Church and Kendrick, of West Point, called at our camp to see Soulé and myself. Soulé had been under their tuition, and afterwards an assistant teacher at West Point. I found them very hearty and cordial in manner, very gentlemanly in spirit, polished and urbane, and, of course, very intelligent. I was really much delighted with them. They had just returned from Yosemite, and are enthusiastic in their admiration of its wonders. They are going to the Big Trees to-day, and return to San Francisco to-morrow. These gentlemen, of course, are not taking it in the rough way as we are. They are dressed *cap-à-pie*, and look like civilized gentlemen. They seem to admire our rough garb, and we are not at all ashamed of it.

About ten o'clock we all went down to the river, provided with soap, and washed underflannels, stockings, handkerchiefs, towels, etc. It was really a comical scene. I wish our friends in Oakland could have taken a peep—the whole party squatting on the rocks on the margin of the river, soaping, and scrubbing, and wringing, and hanging out. After clothes-washing we took a swim in the river; then returned to camp, wrote letters home, and ate dinner.

In the afternoon, Professors Church and Kendrick again called at our camp and bade us good-by. While preparing and eating our supper, two ladies from Oakland, now staying at Clark's, friends of Phelps and Hawkins, called

at our camp-fire and were introduced. They seemed much amused at our rough appearance, our rude mode of eating, and the somewhat rude manners of the young men towards each other. Their little petticoated forms, so clean and white; their gentle manners; and, above all, their sweet, smooth, womanly faces, contrasted, oh! how pleasantly, with our own rough, bearded, forked appearance. They tasted some of our bread, and pronounced it excellent. Ah, the sweet, flattering, deceitful sex! It was really execrable stuff; we had not yet learned to make it palatable.

JULY 29.—Started for the Big Trees at 7 A. M. Five of the party walked, and five rode. I preferred riding, and I had no cause to regret it. The trail was very rough, and almost the whole way up-mountain; the distance about six miles, and around the grove two miles, making fourteen miles in all. The walkers were very much heated and fatigued, and drank too freely of the ice-cold water of the springs. The abundance and excessive coldness of the water seem closely connected with the occurrence of these trees.

My first impressions of the Big Trees were somewhat disappointing; but, as I passed from one to another; as, with upturned face, I looked along their straight, polished shafts, towering to the height of three hundred feet; as I climbed up the sides of their prostrate trunks, and stepped from end to end; as I rode around the standing trees and into their enormous hollows; as we rode through the hollows of some of these prostrate trunks, and even chased one another on horseback through these enormous, hollow cylinders, a sense of their immensity grew upon me. If they stood by themselves on a plain, they would be more immediately striking. But they are giants among giants. The whole forest is filled with magnificent trees, sugar-pines, yellow pines, and spruce, eight to ten feet in diameter, and two hundred to two hundred and fifty feet high. The

sugar-pine, especially, is a magnificent tree in size, height, and symmetry of form.

Of all the big trees of this grove, and, therefore, of all the trees I have ever seen, the Grizzly Giant impressed me most profoundly; not, indeed, by its tallness or its symmetry, but by the hugeness of its cylindrical trunk, and by a certain gnarled grandeur, a fibrous, sinewy strength, which seems to defy time itself. The others, with their smooth, straight, tapering shafts, towering to the height of three hundred feet, seemed to me the type of youthful vigor and beauty in the plentitude of power and success. But *this*, with its large, rough, knobbed, battered trunk, more than thirty feet in diameter — with top broken off and decayed at the height of one hundred and fifty feet — with its great limbs, six to eight feet in diameter, twisted and broken — seemed to me the type of a great life, decaying, but still strong and self-reliant. Perhaps my own bald head and grizzled locks — my own top, with its decaying foliage — made me sympathize with this grizzled giant; but I found the Captain, too, standing with hat in hand, and gazing in silent, bare-headed reverence upon the grand old tree.

We lunched at the Big Trees, rested, examined them three or four hours, and then returned to camp. Then went down to the creek, and enjoyed a delicious swimming-bath. On the way back to camp, stopped at Clark's, and became acquainted with President Mark Hopkins and his family. He goes to Yosemite to-morrow. We will see him again. After supper, the young men, sitting under the tall pines, sang in chorus. The two ladies, already spoken of, hearing the music, came down to our camp, sat on the ground, and joined in the song. Cobb's noisy tenor, fuller of spirit than music, Pomroy's bellowing baritone, and, especially, Stone's deep, rich, really fine bass, harmonized very pleasantly with the thin clearness of the feminine voices. I really enjoyed the song and the scene very greatly.

Women's faces and women's voices, after our rough life, and contrasted with our rough forms—ah! how delightful! About 9:30 P. M. they left, and we all turned in for the night. For an hour I lay upon my back, gazing upwards through the tall pines into the dark, starry sky, which seemed almost to rest on their tops, and listening to the solemn murmurings of their leaves, which, in the silent night, seemed like the whisperings of spirits of the air above me.

JULY 30. —Got up at 4 A. M. My turn to play cook. But cooking for ten hungry men, in two frying pans, is no play. It requires both time and patience. We did not get off until 7 A. M. Captain not very well to-day—too much violent exercise and ice-cold water yesterday. Another bucking farce this morning. Captain's horse, it seems, has more style and spirit than bottom. He has become badly galled, and has been a constant source of annoyance to the Captain, since we left. He therefore concluded to leave his horse here at Clark's, to "heal him of his greivous wounds," and hire a mule, at least while we remain at Yosemite. He no sooner mounted than the mule started off in the contrary direction, kicking, and plunging, and jumping stiff-legged, until he threw off—not the Captain, indeed, but the pack behind the saddle.

After some delay, however, we started off fairly. No more roads hereafter; only steep, rough mountain trails. We are heartily glad, for we have no dust. President Hopkins and party started off with us. His party consisted of himself, wife, son, and several other ladies and gentlemen, and a guide, numbering in all eight. Our party numbered ten and pack. Together, we made a formidable cavalcade. The young men were in high spirits. They sang and hallooed and cracked jokes the whole way. Rode twelve miles, up-hill nearly all the way, and camped

for noon at Westfall's Meadows, over 7,000 feet above sea-level. Hopkins' party went on a mile or two, to Paragoy's (the half-way house to Yosemite), to lunch. In this party is a short, stout, round-faced, laughing-eyed, rather pretty, young woman, in very short bloomer costume, which shows a considerable portion of two very fat legs. Her bloomer makes her look still more squat; and to make things worse, she cannot forego the fashionable bunch of knots and bows and ribbons on or below the waist, behind. Altogether, she was an amusing figure. Our young men called her "Miss Bloomer." The Captain, I think, is struck, but he worships, as yet, only at a distance.

In the afternoon we pushed on, to get our first view of Yosemite this evening, from Sentinel Dome and Glacier Point. Passing Paragoy's, I saw a rough-looking man standing in an open place, with easel on thumb, and canvas before him, alternately gazing on the fine mountain view and painting. "Hello! Mr. Tracy, glad to see you." "Why, Doctor, how do you do? where are you going?" "Yosemite, the High Sierra, Lake Mono, and Lake Tahoe." "Ah! how I wish I could go with you." After a few such pleasant words of greeting and inquiry, I galloped on, and overtook our party on the trail to Glacier Point. About 5 P. M. we passed a high pile of rocks, called Ostrander's Rocks. The whole trail, from Westfall's Meadows to Glacier Point, is near eight thousand feet high. From this rocky prominence, therefore, the view is really magnificent. It was our first view of the Peaks and Domes about Yosemite, and of the more distant High Sierra, and we enjoyed it beyond expression. But there are still finer views ahead, which we must see this afternoon—yes, this very afternoon. With increasing enthusiasm we pushed on until, about 6 P. M., we reached and climbed Sentinel Dome. This point is four thousand five hundred feet above Yosemite Valley, and eight thousand five hun-

dred feet above the sea. The view which here burst upon us, of the Valley and the Sierra, it is simply impossible to describe. Sentinel Dome stands on the south margin of Yosemite, near the point where it branches into three cañons. To the left stands El Capitan's massive perpendicular wall; directly in front, and distant about one mile, Yosemite Falls, like a gauzy veil, rippling and waving with a slow, mazy motion; to the right the mighty granite mass of Half Dome lifts itself in solitary grandeur, defying the efforts of the climber; to the extreme right, and a little behind, Nevada Fall, with the cap of Liberty; in the distance, innumerable peaks of the High Sierra, conspicuous among which are Cloud's Rest, Mt. Starr King, Cathedral Peak, etc. We remained on the top of this Dome more than an hour, to see the sunset. We were well repaid—such a sunset I never saw; such a sunset, combined with such a view, I had never imagined. The gorgeous golden and crimson in the west, and the exquisitely delicate, diffused rose-bloom, tingeing the cloud caps of the Sierra in the east, and the shadows of the grand peaks and domes slowly creeping up the valley! I can never forget the impression. We remained, enjoying this scene, too long to think of going to Glacier Point this evening. We therefore put this off until morning, and returned on our trail about one and a half miles, to a beautiful green meadow, (Hawkins had chosen it on his way to Sentinel Dome), and there made camp in a grove of magnificent fir-trees (*Abies magnifica*).

JULY 31, SUNDAY.—I got up at peep of day this morning, (I am dishwash to-day,) roused the party, started a fire, and in ten minutes tea was ready. All partook heartily of this delicious beverage, and started on foot to see the sunrise, from Glacier Point. This point is about one and a half miles from our camp, about three thousand two hundred feet above the valley, and forms the salient angle on



THE MERCED CAÑON FROM GLACIER POINT.



the south side, just where the valley divides into three. We had to descend about eight hundred feet to reach it. We arrived just before sunrise. Sunrise from Glacier Point! No one can appreciate it who has not seen it. It was our good fortune to have an exceedingly beautiful sunrise. Rosy-fingered Aurora revealed herself to us, her votaries, more bright and charming and rosy than ever before. But the great charm was the view of the valley and surrounding peaks, in the fresh, cool morning hour and in the rosy light of the rising sun; the bright, warm light on the mountain tops, and the cool shade in the valley. The shadow of the grand Half Dome stretches clear across the valley, while its own "bald, awful head" glitters in the early sunlight. To the right, Vernal and Nevada Falls, with their magnificent, overhanging peaks, in full view; while directly across, see the ever-rippling, ever-swaying, gauzy veil of the Yosemite Fall, reaching from top to bottom of the opposite cliff, two thousand six hundred feet. Below, at a depth of three thousand two hundred feet, the bottom of the valley lies like a garden. There, right under our noses, are the hotels, the orchards, the fields, the meadows (near one of these Hawkins even now selects our future camp), the forests, and through all the Merced River winds its apparently lazy, serpentine way. Yonder, up the Tenaya Cañon, nestling close under the shadow of Half Dome, lies Mirror Lake, fast asleep, her polished, black surface not yet ruffled by the rising wind. I have heard and read much of this wonderful valley, but I can truly say I have never imagined the grandeur of the reality.

After about one and a half hour's rapturous gaze, we returned to camp and breakfasted. I had left Glacier Point a few minutes before most of the party, as I was dishwash, and had, therefore, to help the cook prepare breakfast. At breakfast I learned that two of the young men, Cobb and Perkins, had undertaken the foolish enterprise of going

down into the valley by a cañon just below Glacier Point, and returning by 4 P. M. Think of it! three thousand three hundred feet perpendicular, and the declivity, it seemed to me, about forty-five degrees, in the cañon.

After breakfast we returned to Glacier Point, and spent the whole of the beautiful Sunday morning in the presence of grand mountains, yawning chasms, and magnificent falls. What could we do better than allow these to preach to us? Was there ever so venerable, majestic, and eloquent a minister of natural religion as the grand old Half Dome? I withdrew myself from the rest of the party and drank in his silent teachings for several hours. About 1 P. M. climbed Sentinel Dome, and enjoyed again the matchless panoramic view from this point, and about 2 P. M. returned to camp.

Our camp is itself about four thousand feet above the valley, and eight thousand above sea-level. By walking about one hundred yards from our camp-fire, we get a most admirable view of the Sierra, and particularly a most wonderfully striking view of the unique form of Half Dome, when seen in profile. I enjoyed this view until nearly time to saddle up.

Our plan is to return to Paragoy's, only seven miles, this afternoon, and go to Yosemite to-morrow morning. It is 3:30 P. M., and the young men who went down into the valley have not yet returned. We feel anxious. Will they return, or remain in the valley? Shall we remain to-night and wait for them, or go on leading their horses, with the expectation of meeting them in the valley. We are to leave at four; we must decide soon. These discussions were cut short by the appearance of the delinquents themselves, faint with fatigue. They had been down, taken dinner, and returned. We started immediately for Paragoy's, where we arrived 6 P. M., and camped in a grove on the margin of a fine meadow. At Paragoy's we bought a quarter of mountain mutton. We have been living on bacon and bread for some time. The

voracity with which we devoured that mutton may be more easily imagined than described.

Ever since we have approached the region of the High Sierra, I have observed the great massiveness and grandeur of the clouds, and the extreme blueness of the sky. In the direction of the Sierra hang always magnificent piles of snow-white cumulus, sharply defined against the deep blue sky. These cloud-masses have ever been my delight. I have missed them sadly since coming to California, until this trip. I now welcome them with joy. Yesterday and to-day I have seen, in many places, snow lying on the northern slopes of the high peaks of the Sierra.

AUGUST 1.—*Yosemite to-day!* Started as usual, 7 A. M. President Hopkins and family go with us. They had stayed at Paragoy's over Sunday. I think we kept Sunday better. Glorious ride this morning, through the grand fir forests. This is enjoyment, indeed. The trail is tolerably good until it reaches the edge of the Yosemite chasm. On the trail a little way below this edge there is a jutting point called "Inspiration Point," which gives a good general view of the lower end of the valley, including El Capitan, Cathedral Rock, and a glimpse of Bridal Veil Fall. After taking this view we commenced the descent into the valley. The trail winds backward and forward on the almost perpendicular sides of the cliff, making a descent of about three thousand feet in three miles. It was so steep and rough that we preferred walking most of the way and leading the horses. Poor old Mrs. Hopkins, though a heavy old lady, was afraid to ride, and therefore walked the whole way. At last, 10 A. M., we were down, and the gate of the valley is before us, El Capitan guarding it on the left, and Cathedral Rock on the right; while over the precipice on the right, the silvery gauze of Bridal Veil is seen swaying to and fro.

We encamped in a fine forest, on the margin of Bridal Veil Meadow, under the shadow of El Capitan, and about one-quarter of a mile from Bridal Veil Fall. Turned our horses loose to graze, cooked our midday meal, refreshed ourselves by swimming in the Merced, and then, 4:30 p. m., started to visit Bridal Veil. We had understood that this was the best time to see it. Very difficult clambering to the foot of the fall up a steep incline, formed by a pile of huge bowlders fallen from the cliff. The enchanting beauty and exquisite grace of this fall well repaid us for the toil. At the base of the fall there is a beautiful pool. Standing on the rocks, on the margin of this pool, right opposite the fall, a most perfect unbroken circular rainbow is visible. Sometimes it is a double circular rainbow. The cliff more than six hundred feet high; the wavy, billowy, gauzy veil, reaching from top to bottom; the glorious crown, woven by the sun for this beautiful veiled bride,—those who read must put these together and form a picture for themselves, by the plastic power of the imagination.

Some of the young men took a swim in the pool and a shower-bath under the fall. I would have joined them, but I had just come out of the Merced River. After enjoying this exquisite fall until after sunset, we returned to camp. On our way back, amongst the loose rocks on the stream margin, we found and killed another rattlesnake. This is the fourth we have killed.

Hawkins, the enterprising and indefatigable, has been, to-day, up to the hotel for supplies. He has returned, bringing among other things, a quarter of mutton, and two pounds of butter. These, with a due amount of bread, etc., scarcely stayed our fierce appetites. After supper we lit cigarettes, gathered around the camp-fire and conversed. Some question of the relative merits of novelists was started, and my opinion asked. By repeated questions I was led into quite a disquisition on art and literature, which



THE GATES OF THE VALLEY.



lasted until bedtime. Before retiring, as usual we piled huge logs on the camp-fire; then rolled ourselves in our blankets, within reach of its warmth.

Forming part of the cliff, at the base of Bridal Veil Fall, I observed a remarkable mass of dark rock, like diorite, veined in the most complicated manner with whitish granite. In some places the granite predominates, and incloses isolated masses of diorite.

AUGUST 2.—Started this morning up the valley. As we go, the striking features of Yosemite pass in procession before us. On the left, El Capitan, Three Brothers, Yosemite Falls; on the right, Cathedral Rock, Cathedral Spires, Sentinel Rock. Cathedral Spires really strongly remind one of a huge cathedral, with two tall, equal spires, five hundred feet high, and several smaller ones. I was reminded of old Trinity, in Columbia. But *this* was not made with hands, and is over two thousand feet high. Stopped at Hutchings' and took lunch. Here I received letters from home. All well, thank God! Here again met President Hopkins and party; also our friend Miss Bloomer greeted us merrily. Soulé seems deeply smitten, poor fellow! We here had our party photographed in costume. The photographer is none of the best, but we hope the picture will be a pleasure to our friends in Oakland.

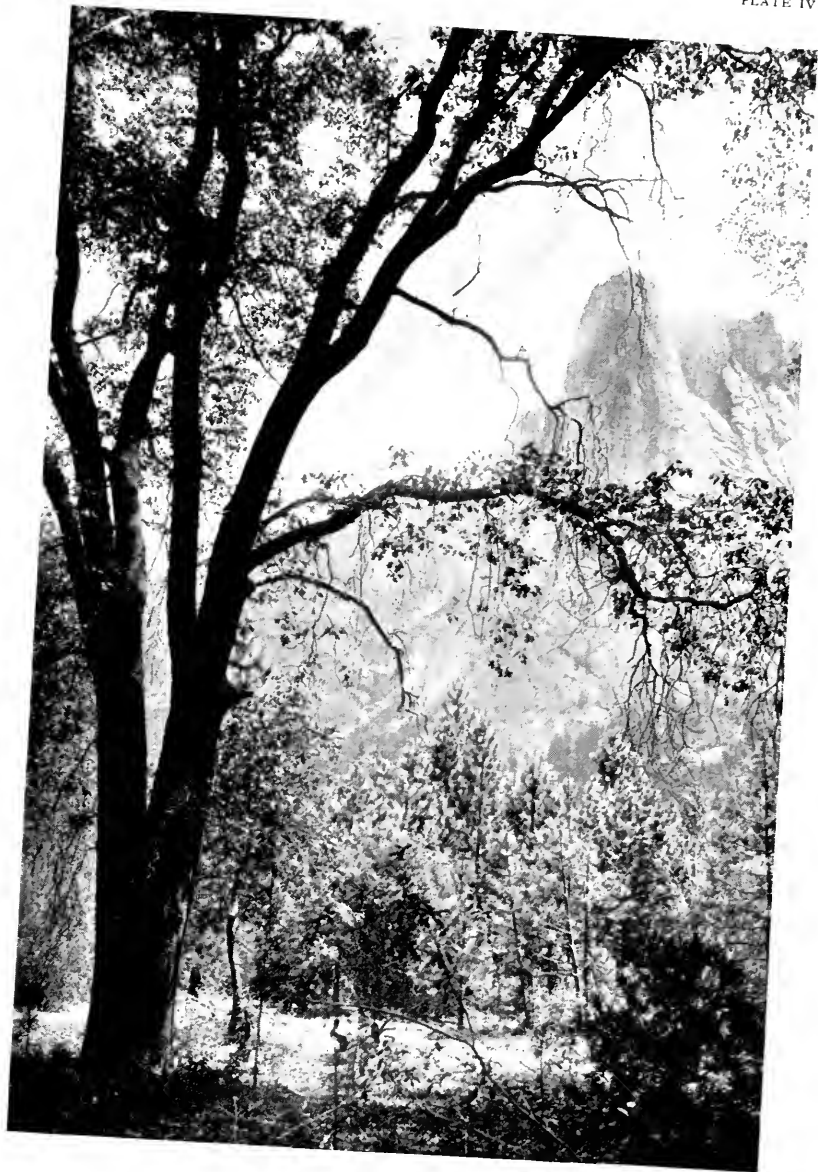
We first tried it on horseback, but found it impossible. We must be content to leave out these noble animals. Captain is secretly glad—he has left his high-stepping gray at Clark's, and now bestrides a sorry mule. Those ears, he thinks, don't look martial. Now, then, for a striking group!

As the most venerable of the party, my position was in the middle, and my bald head, glistening in the sunshine, was supposed to give dignity to the group. I was supported on either hand by Captain and Perkins, as the

handsomest. Dignity supported by beauty—fitting union! Beyond these, on one side stood grave Bolton, in stiff attitude, with his hand resting on Hawkins' gun; while on the other, Linderman, with broad-brimmed hat thrown back, and chest thrown forward, and his gun strapped across his back, tried in vain to make his humorous face look fierce. On the extreme wings, Cobb with his inevitable rifle, and Phelps with his loose-jointed legs, struck each a tragic attitude. In the foreground, at our feet, were placed the other three. Hawkins' burly bulk, in careless position, occupied the middle, while Pomroy gave solemnity to the left; and on the right, Stone, reclining on his elbow, gathered up his long legs to bring them, if possible, within the view of the great eye of the camera, and placed his broad-brim on his knee, in vain attempts to conceal "their utmost longitude." Far in the background was the granite wall of Yosemite, and the wavy, white waters of the fall. The result is seen in the frontispiece.

In the afternoon went on up the valley, and again the grand procession commences. On the left, Royal Arches, Washington Column, North Dome; on the right, Sentinel Dome, Glacier Point, Half Dome. We pitched our camp in a magnificent forest, near a grassy meadow (the same Hawkins had selected from Glacier Point yesterday), on the banks of Tenaya Fork, and under the shadow of our venerated preacher and friend, the Half Dome, with also North Dome, Washington Column, and Glacier Point in full view.

After unsaddling and turning loose our horses to graze, and resting a little, we went up the Tenaya Cañon about one and a half miles, to Mirror Lake, and took a swimming bath. The scenery about this lake is truly magnificent. The cliffs of Yosemite here reach the acme of imposing grandeur. On the south side the broad face of South Dome rises almost from the water, a sheer precipice, near five



THE SENTINEL.



thousand feet perpendicular; on the north side, North Dome, with its finely rounded head, to an almost equal height. Down the cañon, to the west, the view is blocked by the immense cliffs of Glacier Point and Washington Column; and up the cañon, to the east, the cliffs of the Tenaya Cañon, and Clouds' Rest, and the peaks of the Sierra in the background. On returning to camp, as we expected to remain here for several days, we carried with us a number of "shakes" (split boards), and constructed a very good table, around which we placed logs for seats. We cooked our supper, sat around our rude board, and enjoyed our meal immensely. After supper, sat around our camp-fire, smoked our cigarettes, and sang in chorus until 9:30 P. M., then rolled ourselves, chrysalis-like, in our blanket cocoons, and lay still until morning.

Already I observe two very distinct kinds of structure in the granite of this region, which, singly or combined, determine all the forms about this wonderful valley. These two kinds of structure are the concentric structure, on an almost inconceivably grand scale; and a rude, columnar structure, or perpendicular cleavage, also on a grand scale. The disintegration and exfoliation of the granite masses of the concentric structures give rise to the bald, rounded domes; the structure itself is well seen on Sentinel Dome, and especially in the Royal Arches. The columnar structure, by disintegration, gives rise to Washington Column, and the sharp peaks, like Sentinel Rock and Cathedral Spires. Both these structures exist in the same granite, though the one or the other may predominate. In *all* the rocks about Yosemite there is a tendency to cleave perpendicularly. In addition to this, in many there is also a tendency to cleave in concentric layers, giving rise to dome-like forms. Both are well seen combined in the grand mass of Half Dome. The perpendicular face-wall of this dome is the result of the perpendicular cleavage. Whatever may

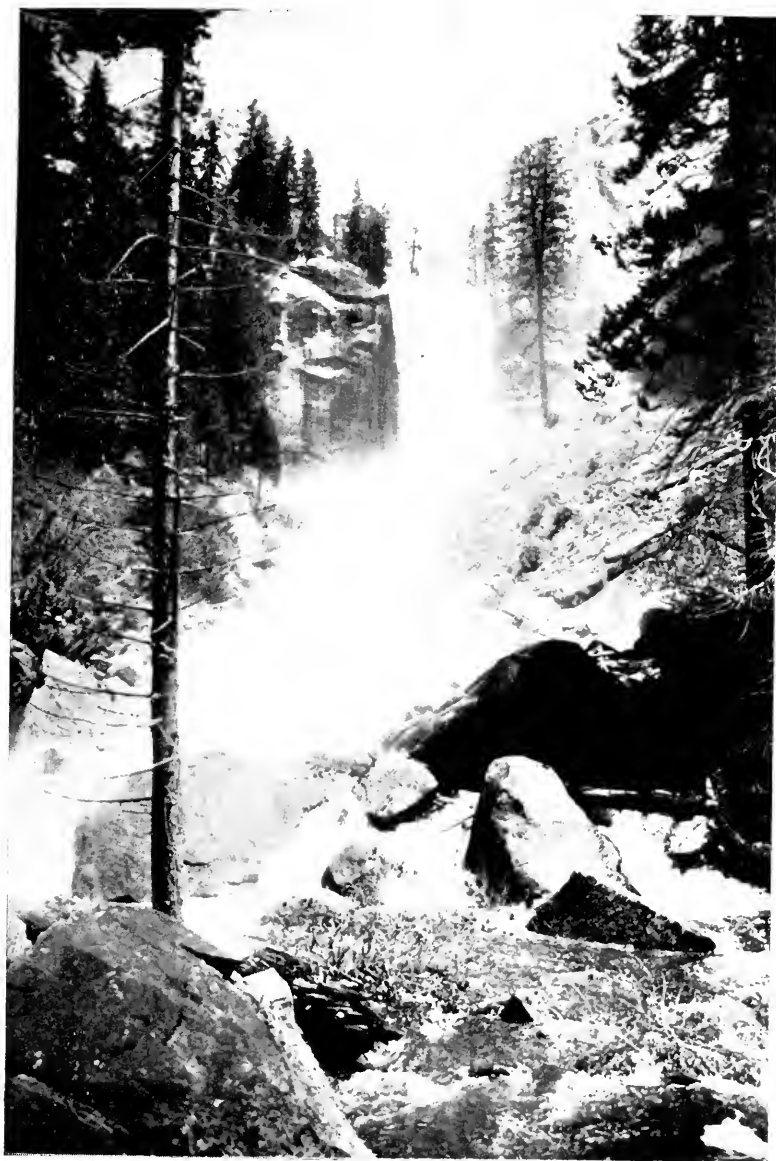
be our theory of the formation of Yosemite chasm and the perpendicularity of its cliffs, we must not leave out of view this tendency to perpendicular cleavage. I observe, too, that the granite here is very coarse-grained, and disintegrates into dust with great rapidity.

I observed, to-day, the curious straw- and grass-covered stacks in which the Indians store and preserve their supplies of acorns.

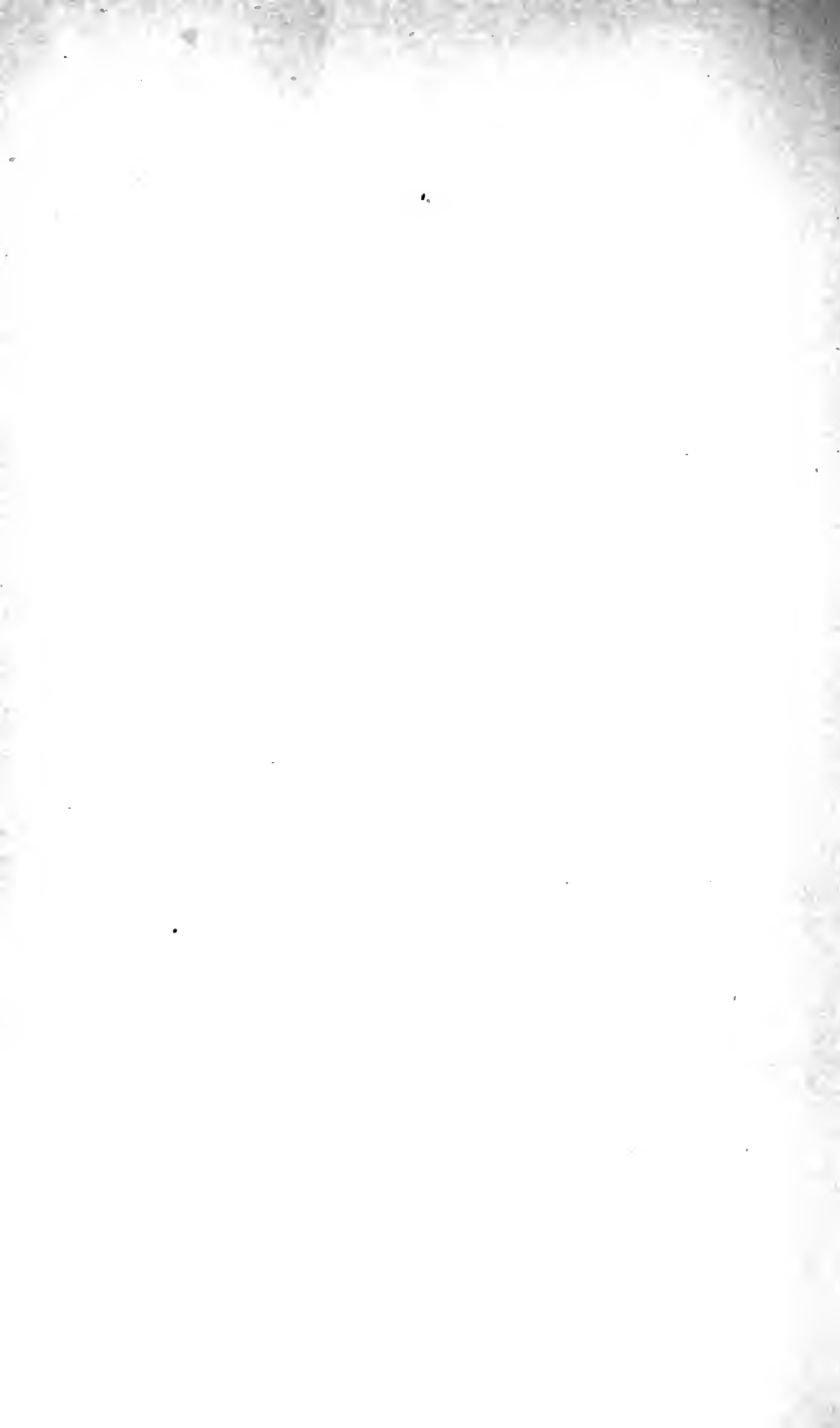
AUGUST 3.—This has been to me a day of intense enjoyment. Started off this morning, with six others of the party, to visit Vernal and Nevada Falls. There are many Indians in the valley. We do not think it safe to leave our camp.* We therefore divide our party every day, a portion keeping guard. Soulé, Phelps, and Perkins were camp-guard to-day.

The Vernal and Nevada Falls are formed by the Merced River itself; the volume of water, therefore, is very considerable in all seasons. The surrounding scenery, too, is far finer, I think, than that of any other fall in the valley. The trail is steep and very rough, ascending nearly two thousand feet to the foot of Nevada Fall. To the foot of Vernal Fall, the trail passes through dense woods, close along the banks of the Merced, which here rushes down its steep channel, forming a series of rapids and cascades of enchanting beauty. We continued our way on horseback, until it seemed almost impossible for horses to go any farther; we then dismounted, unsaddled and hitched our horses, and proceeded on foot. We afterwards discovered that we had already gone over the worst part of the trail to the foot of Vernal Fall before we hitched; we should have continued on horseback to the refreshment cabin at the foot of Vernal Fall. We arrived at the refreshment cabin very much heated, and took some refreshment before proceeding. Here we again saw the

* We learned afterwards that we might have left the camp unguarded with perfect safety.



THE VERNAL FALL.



bright face, the laughing eyes, and fat legs of Miss Bloomer, which were also a very great refreshment. Alas for Captain! he is not with us to-day.

The Vernal Fall is an absolutely perpendicular fall of four hundred feet, surrounded by the most glorious scenery imaginable. The exquisite greenness of the trees, the grass, and the moss renders the name peculiarly appropriate. The top of the fall is reached by step-ladder, which ascends the absolutely perpendicular face of the precipice. From the top the view is far grander than from below; for we take in the fall and the surrounding scenery at one view. An immense natural parapet of rock rises, breast-high, above the general surface of the cliff, near the fall. Here one can stand securely, leaning on the parapet, and enjoy the magnificent view. The river pitches, at our very feet, over a precipice four hundred feet high, into a narrow gorge, bounded on either side by cliffs such as are seen nowhere except in Yosemite, and completely blocked in front by the massive cliffs of Glacier Point, three thousand two hundred feet high; so that it actually seems to pitch into an amphitheater, with rocky walls higher than its diameter. Oh! the glory of the view! — the emerald green and snowy white of the falling water; the dizzying leap into the yawning chasm; the roar and foam and spray of the deadly struggle with rocks below; the deep green of the somber pines, and the exquisitely fresh and lively green of grass, ferns, and moss, wet with eternal spray; the perpendicular rocky walls, rising far above us toward the blue arching sky. As I stood there, gazing down into the dark and roaring chasm, and up into the clear sky, my heart swelled with gratitude to the Great Author of all beauty and grandeur.

After enjoying this view until we could spare no more time, we went on about one-half mile to the foot of Nevada Fall. Mr. Pomroy and myself mistook the trail, and went up the left side of the river to the foot of the fall. To attain this

point we had to cross two roaring cataracts, under circumstances of considerable danger, at least to any but those who possess steady nerves. We finally succeeded in clambering to the top of a huge boulder, twenty feet high, immediately in front of the walls, and only thirty or forty feet from it. Here, stunned by the roar, and blinded by the spray, we felt the full power and grandeur of the fall. From this place we saw, and greeted with Indian yell, our companions on the other side of the river. After remaining here an hour, we went a little down the stream and crossed to the other side, and again approached the fall. The view from this, the right side, is the one usually taken. It is certainly the finest scenic view, but the power of falling water is felt more grandly from the nearer view on the other side. The lover of intense ecstatic emotion will prefer the latter; the lover of quiet scenic beauty will prefer the former. The poet will seek inspiration in the one, and the painter in the other.

The Nevada Fall is, I think, the grandest I have ever seen. The fall is six hundred to seven hundred feet high. It is not an absolutely perpendicular leap, like Vernal, but is all the grander on that account; as, by striking several ledges in its downward course, it is beaten into a volume of snowy spray, ever-changing in form, and impossible to describe. From the same cause, too, it has a slight, S-like curve, which is exquisitely graceful. But the magnificence of the Yosemite cascades, especially of Vernal and Nevada Falls, is due principally to the accompanying scenery. See Cap of Liberty and its fellow peak, rising perpendicular, tall and sharp, until actually (I speak without exaggeration) the intense blue sky and masses of white clouds seem to rest supported on their summits. The actual height above the fall is, I believe, about two thousand feet.

About 3 P. M. started on our return. There is a beautiful pool, about three hundred feet long and one hundred and



THE NEVADA FALL.



fifty to two hundred feet wide, immediately above the Vernal Fall. Into this pool the Merced River rushes as a foaming rapid, and leaves it only to precipitate itself over the precipice, as the Vernal Fall. The fury with which the river rushes down a steep incline, into the pool, creates waves like the sea. On returning, all of us who were good swimmers refreshed ourselves by swimming in this pool. I enjoyed the bath immensely; swam across, played among the waves, contended with the swift current, shouted and laughed like the veriest boy of them all. The water was of course very cold, but we have become accustomed to this. On coming out of my bath, I took one final look over the rocky parapet, over the fall, and into the yawning chasm below.

Returned to camp 5 P. M., fresh and vigorous, and with a keen appetite for supper. After enjoying that most important meal, as usual, we gathered around our camp-fire, sat on the ground, and the young men sang in chorus.

AUGUST 4.—This has been to me an uneventful day; I stayed in camp to-day as one of the camp-guard, while the camp-guard of yesterday visited the Vernal and Nevada Falls. I have lolled about camp, writing letters home, sewing on buttons, etc.; but most of the time in a sort of day-dream—a glorious day-dream in the presence of this grand nature. Ah! this free life in the presence of great Nature, is indeed delightful. There is but one thing greater in this world; one thing after which, even under the shadow of this grand wall of rock, upon whose broad face and summit line projected against the clear blue sky with upturned face I now gaze; one thing after which even now I sigh with inexpressible longing, and that is Home and Love. A loving human heart is greater and nobler even than the grand scenery of Yosemite. In the midst of the grandest scenes of yesterday, while gazing alone upon the falls and

the stupendous surrounding cliffs, my heart filled with gratitude to God and love to the dear ones at home; my eyes involuntarily overflowed, and my hands clasped in silent prayer.

In the afternoon we took our usual swim in the Mirror Lake; after which, of course, supper and bed.

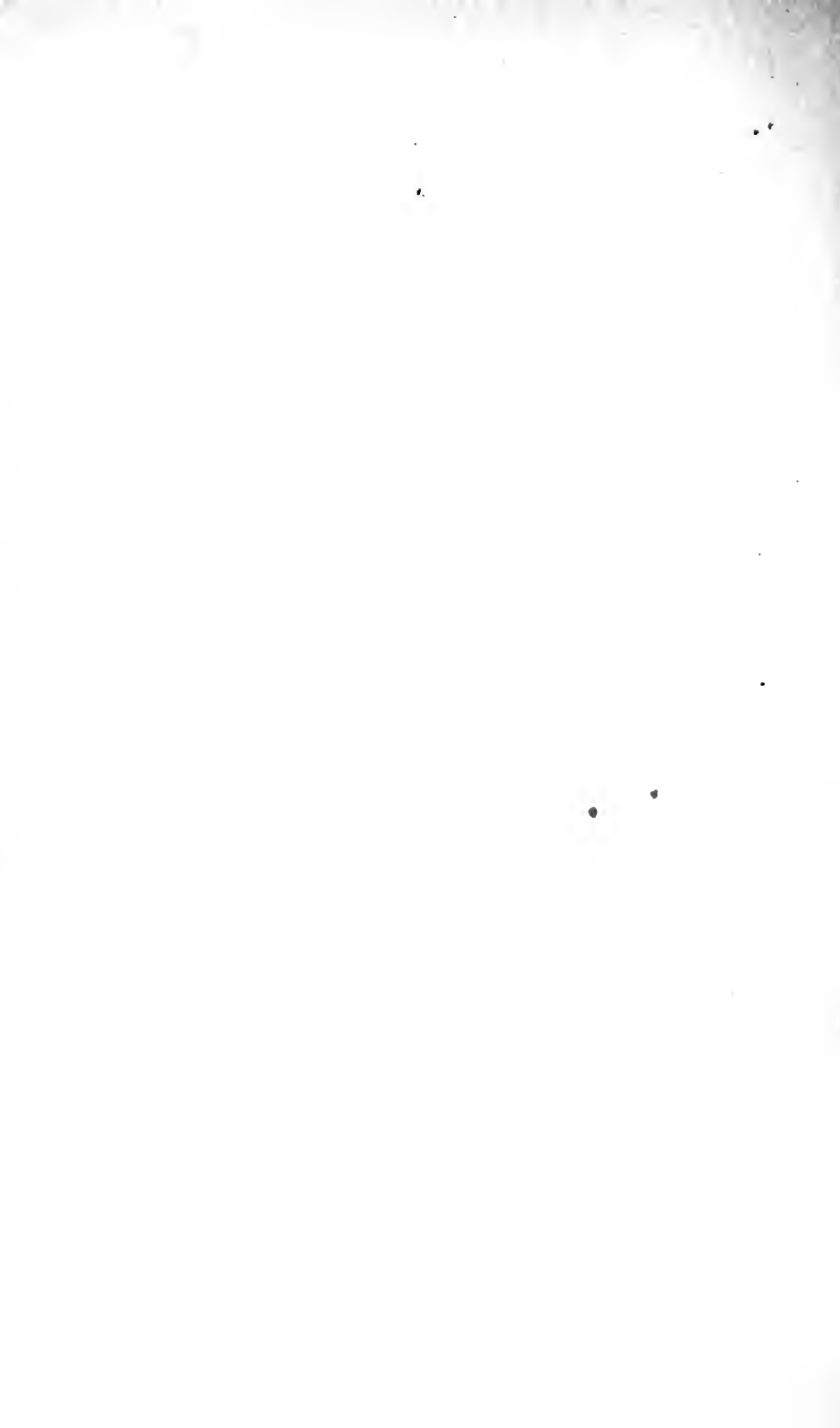
AUGUST 5.—To-day to Yosemite Falls. This was the hardest day's experience yet. We thought we had plenty of time, and therefore started late. Stopped a moment at the foot of the falls, at a saw-mill, to make inquiries. Here found a man in rough miller's garb, whose intelligent face and earnest, clear blue eye, excited my interest. After some conversation, discovered that it was Mr. Muir, a gentlemen of whom I had heard much from Mrs. Prof. Carr and others. He had also received a letter from Mrs. Carr, concerning our party, and was looking for us. We were glad to meet each other. I urged him to go with us to Mono, and he seemed disposed to do so.

We first visited the foot of the lower fall, which is about four hundred feet perpendicular, and after enjoying it for a half hour or more, returned to the mill. It was now nearly noon. Impossible to undertake the difficult ascent to the upper fall without lunch; I therefore jumped on the first horse I could find (mine was unsaddled) and rode to Mr. Hutchings' and took a hearty lunch, to which Mr. Hutchings insisted upon adding a glass of generous California wine. On returning, found the rest of the party at the mill. On learning my good fortune, they also went and took lunch.

We now commenced the ascent. We first clambered up a mere pile of loose débris (talus), four hundred feet high, and inclined at least 45° to 50°. We had to keep near to one another, for the bowlders were constantly loosened by the foot, and went bounding down the incline until they



THE GREAT YOSEMITE FALLS.



reached the bottom. Heated and panting, we reached the top of the lower fall, drank, and plunged our heads in the foaming water until thoroughly refreshed. After remaining here nearly an hour, we commenced the ascent to the foot of the upper fall. Here the clambering was the most difficult and precarious I have ever tried; sometimes climbing up perpendicular rock faces, taking advantage of cracks and clinging bushes; sometimes along joint-cracks, on the dizzy edge of fearful precipices; sometimes over rock faces so smooth and highly inclined that we were obliged to go on hands and knees. In many places a false step would be fatal. There was no trail at all; only piles of stones here and there, to mark the best route. But when at last we arrived, we were amply repaid for our labor. Imagine a sheer cliff, sixteen hundred feet high, and a stream pouring over it. Actually, the water seems to fall out of the very sky itself. As I gaze upwards now, there are wisps of snowy cloud just on the verge of the precipice above; the white spray of the dashing cataract hangs, also, apparently almost motionless on the same verge. It is difficult to distinguish wisps of spray from wisps of cloud. So long a column of water and spray is swayed from side to side by the wind; and, also, as in all falls, the resistance of the rocks at the top, and of the air in the whole descent, produces a billowy motion. The combination of these two motions, both so conspicuous in this fall, is inexpressibly graceful. When the column swayed far to the left, we ran by on the right, and got behind the fall, and stood gazing through the gauzy veil, upon the cliffs on the opposite side of the valley. At this season of the year the Yosemite Creek is much diminished in volume. It strikes slightly upon the face of the cliff, about midway up. In the spring and autumn, when the river is full, the fall must be grand indeed. It is then a clear leap of sixteen hundred feet, and the pool which it has hollowed out for itself, in the solid

granite, is plainly visible twenty to thirty feet in advance of the place on which it now falls.

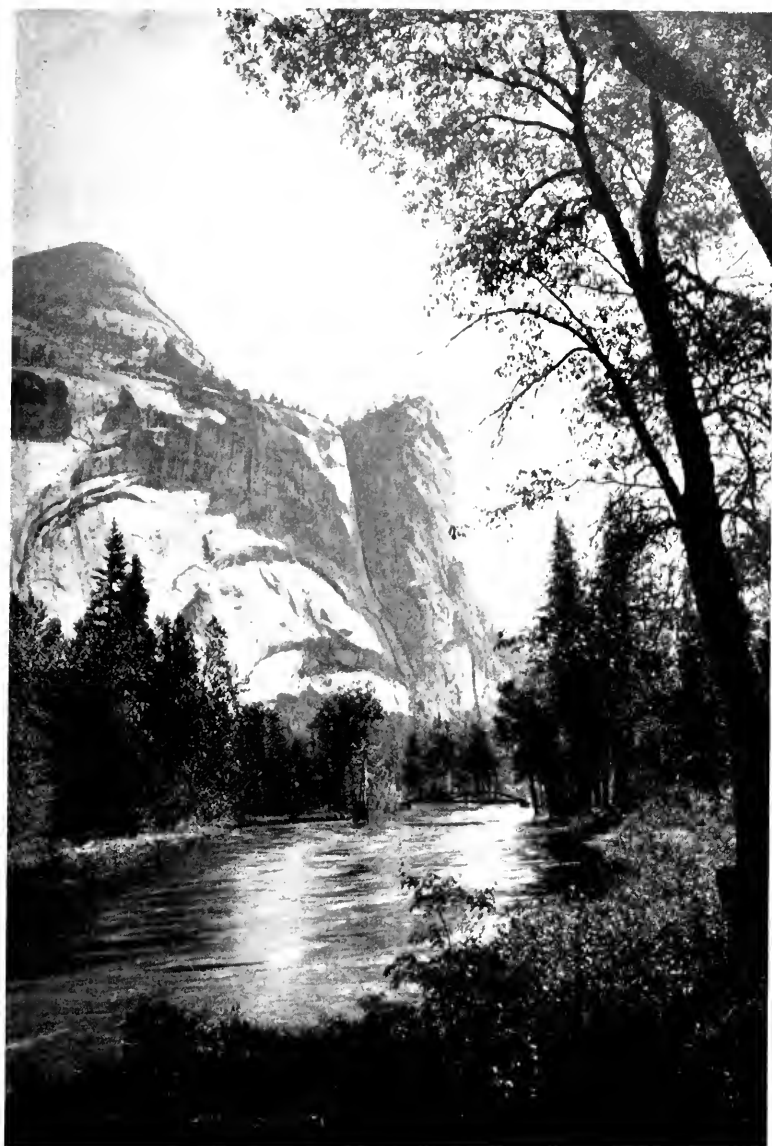
We met here, at the foot of the fall, a real typical specimen of a live Yankee. He has, he says, a panorama of Yosemite, which he expects to exhibit in the Eastern cities. It is evident that he is "doing" Yosemite only for the purpose of getting materials of lectures to accompany his exhibitions.

Coming down, in the afternoon, the fatigue was less, but the danger much greater. We were often compelled to slide down the face of rocks in a sitting posture, to the great detriment of the posterior portion of our trowsers. Reached bottom at half-past five P. M. Here learned from Mr. Muir that he would certainly go to Mono with us. We were much delighted to hear this. Mr. Muir is a gentleman of rare intelligence, of much knowledge of science, particularly of botany, which he has made a specialty. He has lived several years in the valley, and is thoroughly acquainted with the mountains in the vicinity. A man of so much intelligence tending a saw mill!—not for himself, but for Mr. Hutchings. This is California!

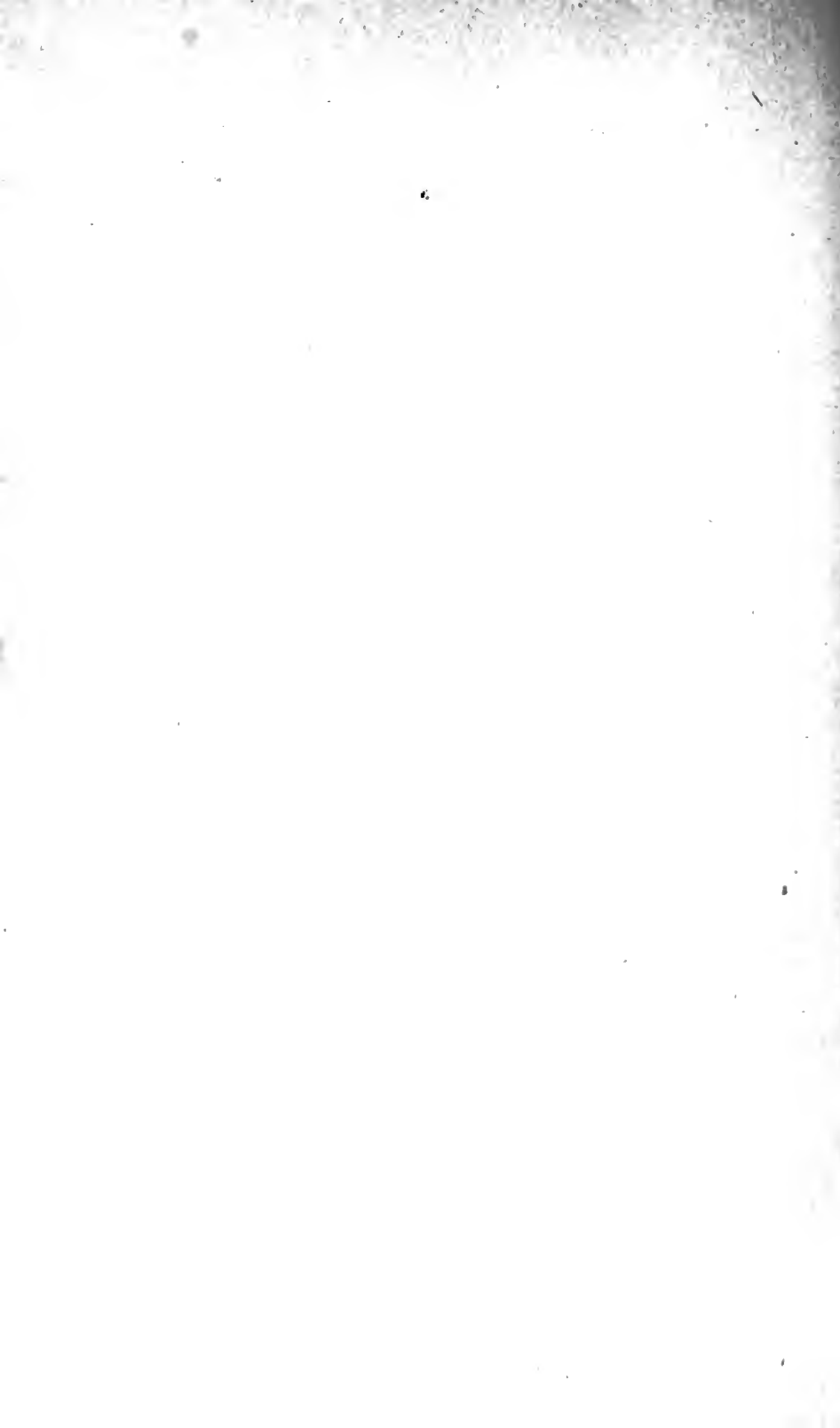
After arranging our time of departure from Yosemite with Mr. Muir, we rode back to camp. I enjoyed greatly the ride to camp, in the cool of the evening. The evening view of the valley was very fine, and changing at every step. Just before reaching our camp, there is a partial distant view of the Illilouette Fall—the only one I know of in the valley. Many of the party seem wearied this evening. For myself, I feel fresh and bright. We were all, however, sound asleep by 8 P. M.*

* Our party did not visit the Illilouette Fall, but on a subsequent trip to Yosemite I did so. The following is a brief description, taken from my journal, which I introduce here in order to complete my account of the falls of this wondrous valley.

AUGUST 15, 1872.—Started with Mr. Muir and my nephew Julian, to visit Illilouette Falls. Hearing that there was no trail, and that the climb is more diffi-



NORTH DOME AND THE ROYAL ARCHES.



AUGUST 6.—Slept late this morning. Some of the party stiff and sore; I am all right. The camp-guard of yesterday visited Yosemite Falls to-day, and we stayed in camp. Visited Mirror Lake this morning to see the fine reflection of the surrounding cliffs in its unruffled waters, in the early morning. Took a swim in the lake; spent the rest of the morning washing clothes, writing letters, and picking and eating raspberries in Lamon's Garden.

To a spectator the clothes-washing forms a very interesting scene. To see us all sitting down on the rocks, on the banks of the beautiful Tenaya River, scrubbing, and wringing, and hanging out! It reminds one of the exquisite washing scene of Princess Nausicaa and her damsels, or of Pharoah's daughter and her maids. Change the sex, and where is the inferiority in romantic interest in our case? Ah! *the sex!* yes, this makes all the difference between the

cult even than that to the Upper Yosemite, the rest of the party *backed out*. We rode up the Merced, on the Vernal Fall trail, to the junction of the Illilouette Fork. Here we secured our horses and proceeded on foot up the cañon. The rise, from this to the foot of the falls, is twelve hundred to fifteen hundred feet. The whole cañon is literally filled with huge rock fragments—often hundreds of tons in weight—brought down from the cliffs at the fall. The scramble up the steep ascent over these boulders was extremely difficult and fatiguing. Oftentimes the creek bed was utterly impracticable, and we had to climb high up the sides of the gorge and down again. But we were gloriously repaid for our labor. There are beauties about this fall which are peculiar, and simply incomparable. It was to me a new experience, and a peculiar joy. The volume of water, when I saw it, was several times greater than either Yosemite or Bridal Veil. The stream plunges into a narrow chasm, bounded on three sides by perpendicular walls nearly one thousand feet high. The height of the fall is six hundred feet. Like Nevada, the fall is not absolutely perpendicular, but strikes about half-way down on the face of the cliff. But instead of striking on projecting ledges and being thus *beaten* into a great volume of foam, as in the latter, it *glides* over the somewhat even surface of the rock, and is *woven* into the most exquisite lacework, with edging fringe and pendent tassels, ever-changing and ever-delighting. It is simply impossible even to conceive, much less to describe, the exquisite delicacy and tantalizing beauty of the ever-changing forms. The effect produced is not tumultuous excitement, or ecstasy, like Nevada, but simple, pure, almost childish delight. Now as I sit on a great boulder, twenty feet high, right in front of the fall, see! the midday sun shoots its beams through the myriad water-drops which leap from the top of the cascade as it strikes the edge of the cliff. As I gaze upwards, the glittering drops seem to pause a moment high in the air and then descend like a glorious star-shower.

ideal and common—between poetry and prose. If it were only seven beautiful women, in simple attire, and I, like Ulysses, a spectator just waked from sleep by their merry peals of laughter! But seven rough, bearded fellows! think of it! We looked about us, but found no little Moses in the bullrushes. So we must e'en take Mr. Muir and Hawkins to lead us through the wilderness of the High Sierra.

In the afternoon we moved camp to our previous camping-ground at Bridal Veil meadow. We were really sorry to break up our camp on Tenaya Creek. We have had delightful times here. We called it *University Camp*. Soon after leaving camp, Soulé and myself, riding together, heard a hollow rumbling, then a crashing sound. "Is it thunder or earthquake?" Looking up quickly, the white streak down the cliff of Glacier Point, and the dust there rising from the valley, revealed the fact that it was the falling of a huge rock mass from Glacier Point.

We rode down in the cool of the evening, and by moonlight. Took leave of our friends *in* the valley—McKee and his party, Mr. and Mrs. Hutchings, Mrs. Yelverton, Miss Bloomer (whom we again met, and with whom Captain exchanged photographs); sad leave of our friends, now dear friends, *of* the valley; the venerable and grand Old South Dome under whose shadow we had camped so long; North Dome, Washington Column, Royal Arches, Glacier Point; then Yosemite Falls, Sentinel Rock, Three Brothers. By this time night had closed in, but the moon was near full, and the shadows of Cathedral Spires and Cathedral Rock lay across our path, while the grand rock mass of El Capitan shone gloriously white in the moonlight. The ride was really enchanting to all, but affected us differently. The young men rode ahead, singing in chorus. I lagged behind, and enjoyed it in silence. The choral music, mellowed by distance, seemed to harmonize with the scene, and to enhance its holy stillness.



THE BRIDAL VEIL FALL.



About half-past eight P. M. we encamped on the western side of Bridal Veil meadow. After supper we were in fine spirits, contended with each other in gymnastic exercises, etc. Then gathered hay, made a delightful, fragrant bed, and slept dreamlessly.

At Mr. Hutchings' I again received letters from home—very happy to know that they are all well.

AUGUST 7.—SUNDAY.—Got up late—6 A. M.—as is common everywhere on this day of rest. Now, about to leave for Mono, Captain must have his horse or he cannot accompany us. He only hired the mule while in Yosemite. Mr. Perkins volunteered to ride the mule back to Clark's and bring Captain's horse. He started very early this morning, and hopes to be back by bedtime.

About 11 A. M. took a quiet swim in the river; for we think a *clean skin* is next in importance to a *pure heart*. During the rest of the morning I sat and enjoyed the fine view of the opening or gate of the valley, from the lower side of the meadow. There stands the grand old El Capitan in massive majesty on the left, and Cathedral Rock and the Veiled Bride on the right. I spent the morning with this scene before me. While sitting here I again took out my little sewing-case and darned my trowsers, a little broken by my experiments in sliding, day before yesterday. God bless the dear thoughtful one who provided me with this necessary article! God bless the little fingers which arranged these needles and wound so neatly the thread! May God's choicest blessings rest on the dear ones at home! May He, the Infinite Love, keep them in health and happiness until I return! Surely, absence from home is sometimes necessary to make us feel the priceless value of loving hearts.

There is considerable breeze to-day; and now, while I write, the Bride's veil is wafted from side to side, and sometimes lifted until I can almost see the blushing face of the

Bride herself—the beautiful spirit of the falls. But whose bride? Is it old El Capitan? Strength and grandeur united with grace and beauty! Fitting union!

At 3 P. M. went again alone to the lower side of the meadow, and sat down before the gate of the valley. From this point I look directly through the gate and up the valley. There again, rising to the very skies, stands the huge mass of El Capitan on one side, and on the other the towering peak of the Cathedral, with the veiled Bride retiring a little back from the too ardent gaze of admiration; then the cliffs of Yosemite, growing narrower and lower on each side, beyond. Conspicuous, far in the distance, see! old South Dome and Cloud's Rest. The sky is perfectly serene, except heavy masses of snow-white cumulus, sharply defined against the deep blue of the sky, filling the space beyond the gate. The wavy motion of the Bride's veil, as I gaze steadfastly upon it, drowns my sense; I sit in a kind of delicious dream, the scenery unconsciously mingling with my dream.

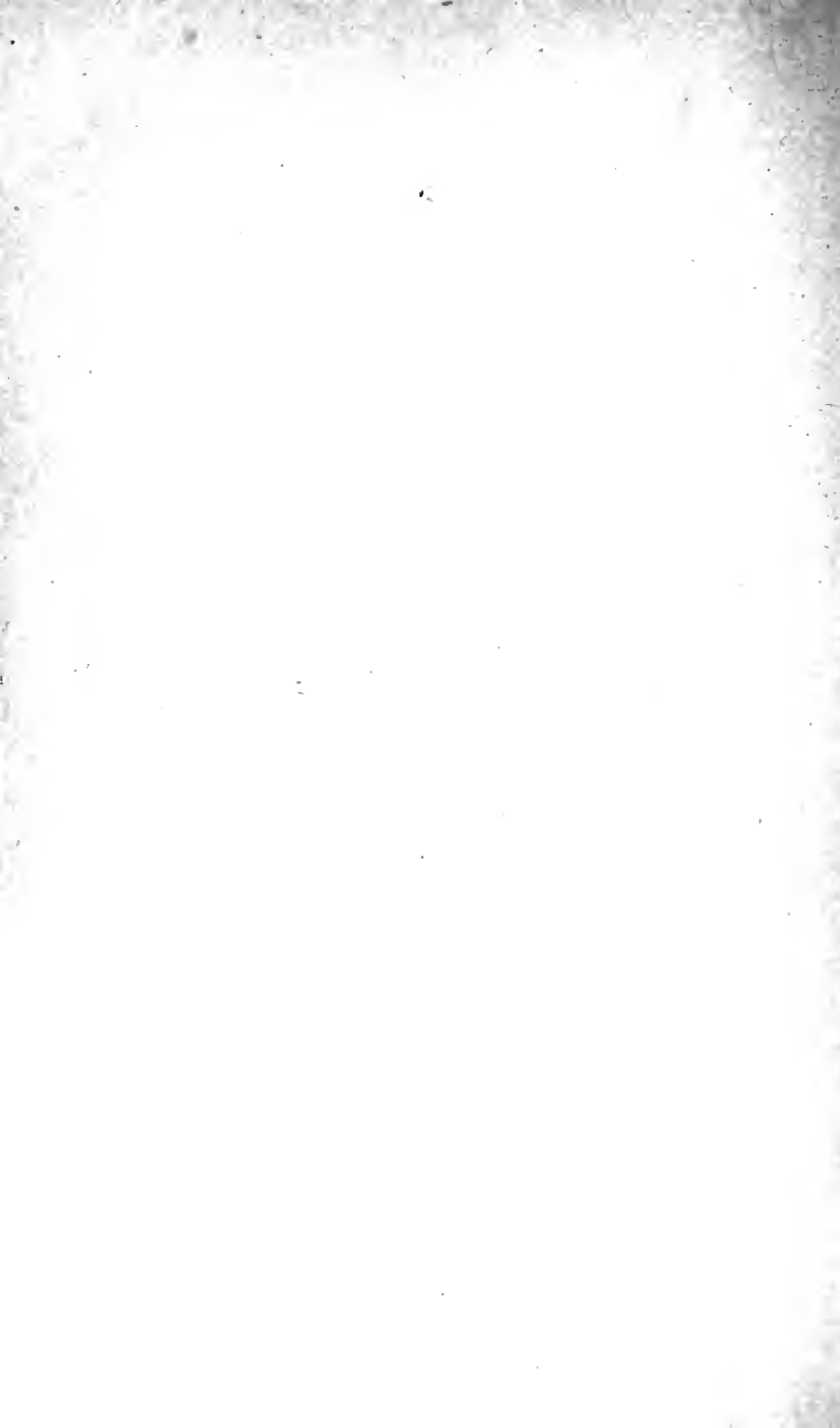
5 P. M. Went, all of us, this afternoon, to visit the Bride. Saw again the glorious crown set by the sun upon her beautiful head. Swam in the pool at her feet. Tried to get a peep beneath the veil, but got pelted beyond endurance with water-drops, by the little fairies which guard her beauty, for my sacreligious rudeness. Nevertheless, came back much exhilarated, and feeling more like a boy than I had felt for many, many years.

Perkins returned with Captain's horse, to supper.

8 P. M. After supper, went again alone into the meadow, to enjoy the moonlight view. The moon is long risen, and "near her highest noon," but not yet visible in this deep valley, although I am sitting on the extreme northern side. Cathedral Rock and the snowy veil of the Bride, and the whole right side of the cañon, is in deep shade, and its serried margin strongly relieved against the bright moonlit



EL CAPITAN.



sky. On the other side are the cliffs of El Capitan, snow-white in the moonlight. Above all arched the deep black sky, studded with stars gazing quietly downward. Here, under the black arching sky and before the grand cliffs of Yosemite, I lifted my heart in humble worship to the great God of *Nature*.

AUGUST 8.—To-day we leave Yosemite ; we therefore get up very early, intending to make an early start. I go out again into the meadow, to take a final farewell view of Yosemite. The sun is just rising ; wonderful, warm, transparent golden light, (like Bierstadt's picture,) on El Capitan ; the whole other side of the valley in deep, cool shade ; the bald head of South Dome glistening in the distance. The scene is magnificent.

But see! just across the Merced River from our camp, a bare trickling of water from top to bottom of the perpendicular cliff. I have not thought it worth while to mention it before ; but this is the Fall called the *Virgin's Tears*. Poor Virgin! she seems *passéé* ; her cheeks are seamed, and channeled, and wrinkled ; she wishes she was a Bride, too, and had a veil: so near El Capitan, too, but he will not look that way. I am sorry I have neglected to sing her praises.

We experienced some delay in getting off this morning. Our horses have feasted so long on this meadow that they seem disinclined to be caught. Pomroy's ill-favored beast, Old 67, gave us much trouble. He had to be lassoed at last. We forded the river immediately at our camp. Found it so deep and rough, that several of the horses stumbled and fell down. We now took Coulterville trail; up, up, up, backwards and forward, up, up, up the almost perpendicular side of the cañon below the gate. The trail often runs on a narrow ledge, along the almost perpendicular cliff. A stumble might precipitate both horse and rider one thousand

feet, to the bottom of the chasm. But the horses know this as well as we. They are very careful. About the place where Mono trail turns sharp back from Coulterville trail, Mr. Muir overtook us. Without him we would have experienced considerable difficulty, for the trail being now little used, except by shepherds, is very rough, and so blind that it is almost impossible to find it, or having found, to keep it. My horse cast two of his shoes to-day. Yet I had examined them before leaving Yosemite, and found them all right.

Made about fourteen miles, and about 2 P. M. reached a meadow near the top of Three Brothers. Here we camped for the night in a most beautiful grove of fir — *Abies concolor* and *magnifica*; chose our sleeping-places; cut branches of spruce and made the most delightful elastic and aromatic beds, and spread our blankets in preparation for night. After dinner, lay down on our blankets, and gazed up through the magnificent tall spruces into the deep blue sky and the gathering masses of white clouds. Mr. Muir gazes and gazes, and cannot get his fill. He is a most passionate lover of nature. Plants, and flowers, and forests, and sky, and clouds, and mountains, seem actually to haunt his imagination. He seems to revel in the freedom of this life. I think he would pine away in a city or in conventional life of any kind. He is really not only an intelligent man, as I saw at once, but a man of strong, earnest nature, and thoughtful, closely observing and original mind. I have talked much with him to-day about the probable manner in which Yosemite was formed. He fully agrees with me that the peculiar cleavage of the rock is a most important point, which must not be left out of account. He farther believes that the valley has been wholly formed by causes still in operation in the Sierra — that the Merced Glacier and the Merced River and its branches, when we take into consideration the peculiar cleavage, and also the rapidity with

which the fallen and falling bowlders from the cliffs are disintegrated into dust, has done the whole work. The perpendicularity is the result of cleavage; the want of talus is the result of the rapidity of disintegration, and the recency of the disappearance of the glacier. I differ with him only in attributing far more to pre-glacial action. I may, I think, appropriately introduce here my observations on the evidence of glacial action in Yosemite.

It is well known that a glacier once came down the Tenaya Cañon. I will probably see abundant evidences of this high up this cañon, to-morrow and next day. That this glacier extended into the Yosemite has been disputed, but is almost certain. Mr. Muir also tells me that at the top of Nevada Fall there are unmistakable evidences (polishings and scorings) of a glacier. There is no doubt, therefore, that anciently a glacier came down each of these cañons. Did they meet and form a Yosemite glacier? From the projecting rocky point which separates the Tenaya from Nevada Cañon, there is a pile of bowlders and débris running out into the valley, near Lamon's garden, like a continuation of the point. Mr. Muir thinks this unmistakably a medial moraine, formed by the union of the Tenaya and Nevada glaciers. I did not examine it carefully. Again, there are two lakes in the lower Tenaya Cañon, viz., Mirror Lake and a smaller lake lower down. Below Mirror Lake, and again below the smaller lake, there is an immense heap of bowlders and rubbish. Are not these piles terminal moraines, and have not the lakes been formed by the consequent damming of the waters of the Tenaya? These lakes are filling up. It seems probable that the meadow, also, on which we camped, has been formed in the same way, by a moraine just below the meadow, marked by a pile of débris there, also. Whether the succession of meadows in the Yosemite, of which the Bridal Veil meadow is the lowest, have been similarly

formed, requires and really deserves further investigation. I strongly incline to the belief that they have been, and that a glacier once filled Yosemite. I observed other evidences, but I must visit this valley 'again, and examine more carefully.

After discussing these high questions with Mr. Muir for some time, we walked to the edge of the Yosemite chasm, and out on the projecting point of Three Brothers, called Eagle Point. Here we had our last, and certainly one of the most magnificent views of the valley and the High Sierra. I can only name the points which are in view, and leave the reader to fill out the picture. As we look up the valley, to the near left is the Yosemite Falls, but not a very good view; then Washington Column, North Dome; then grand old South Dome. The view of this grand feature of Yosemite is here magnificent. It is seen in half profile. Its rounded head, its perpendicular rock face, its towering height, and its massive proportions are well seen. As the eye travels round to the right, next comes the Nevada Fall (Vernal is not seen); then in succession the peaks on the opposite side of the valley; Glacier Point, Sentinel Dome, Sentinel Rock, Cathedral Spires, and Cathedral Rock; then, crossing the valley, and behind us, is El Capitan. In the distance, the peaks of the Sierra, Mt. Hoffman, Cathedral Peak, Cloud's Rest, Mt. Starr King, Mt. Clark, and Ostrander's Rocks are seen. Below, the whole valley, like a green carpet, and Merced River, like a beautiful vine, winding through. We remained and enjoyed the view by sunlight, by twilight, and by moonlight. We then built a huge fire, on the extreme summit. Instantly answering fires were built in almost every part of the valley. We shouted and received answer. We fired guns and pistols, and heard reports in return. I counted the time between flash and report, and found it 9-10 seconds. This would make the distance about two miles, in an air line.

About 8 P. M. went back to camp and supper, and immediately after, to bed. During the night some of the horses, not having been staked, wandered away, and some of the party, Soulé, Hawkins, and Cobb, were out two hours, recovering them. They found them several miles on their way back to the fat pasture of Bridal Veil meadow. My own horse had been securely staked. On my fragrant, elastic bed of spruce boughs, and wrapped head and ears in my blankets, I knew nothing of all this until morning.

Coming out of the Yosemite to-day, Mr. Muir pointed out to me, and I examined, the *Torreya*. Fruit solitary, at extreme end of spray, nearly the color, shape, and size of a green-gage plum, and yet a conifer. The morphology of the fruit would be interesting.

AUGUST 9.—Got up at daybreak this morning much refreshed. I am cook again to-day. My bread this morning was voted excellent. Indeed, it was as light and spongy as any bread I ever ate. About 12 M. we saw a shepherd's camp, and rode up in hopes of buying a sheep. No one at home, but there is much sheep meat hanging about and drying. As we came nearer, a delicious fragrance assailed our nostrils, and set our salivaries in action. "A premonitory moistening overflowed my nether lip." What could it be? Here is a pot nearly buried in the hot ashes, and closely covered. Wonder what is in it? Let us see. On removing the cover, a fragrant steam arose, which fairly overcame the scruples of several of the party. Mutton stew, deliciously seasoned! Mr. Muir, who had been a shepherd himself, and had attended sheep here last year, and became thoroughly acquainted with shepherds' habits, assured us that we might eat without compunction—that the shepherd would be pleased rather than displeased—that they had more mutton than they knew what to do with. Upon this assurance we fell to, for we were very hungry, and the stew

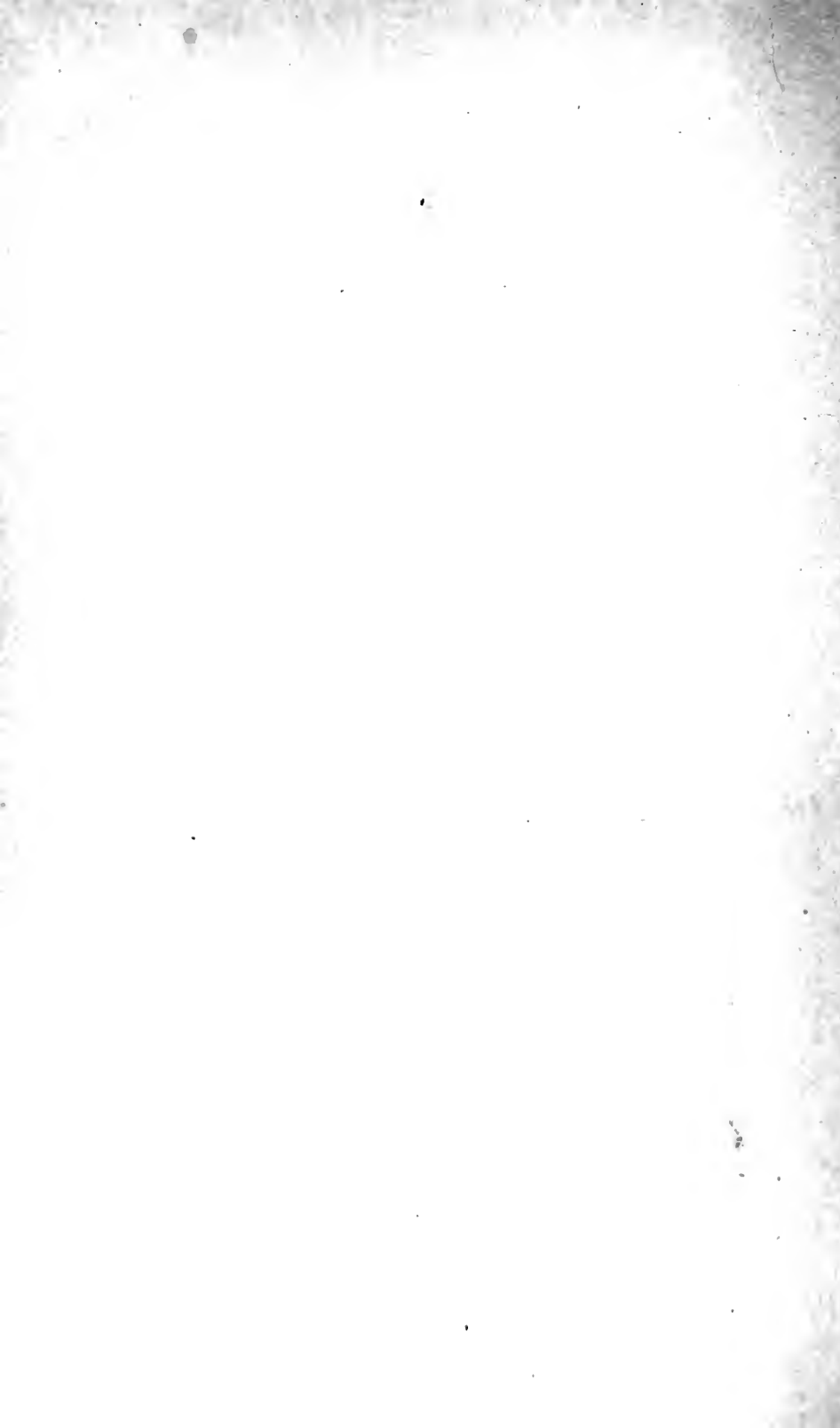
quickly disappeared. We all declared, and will always believe, that there never was such mutton stew made in this world before. While we were yet wiping our mustaches (such as had that ornament), the shepherd appeared, and was highly amused and pleased at our extravagant praises of his stew. Our appetites were, however, not yet half appeased. We went on a little farther and stopped for noon at a small open meadow. While I was cooking dinner, Hawkins bought and butchered a fat sheep. There are thousands of sheep in this region. We expect to live upon mutton until we cross the Sierras.

This afternoon we went on to Lake Tenaya. The trail is very blind, in most places detectable only by the blazing of trees, and very rough. We traveled most of the way on a high ridge. When about two miles of our destination, from the brow of the mountain ridge upon which we had been traveling, Lake Tenaya burst upon our delighted vision, its placid surface set like a gem amongst magnificent mountains, the most conspicuous of which are Mt. Hoffman group on the left, and Cathedral Peak beyond the lake. From this point we descended to the margin of the lake, and encamped at 5 P. M. on the lower end of the lake, in a fine grove of tamaracks, near an extensive and beautiful meadow. We built an immense fire, and had a fine supper of excellent bread and delicious mutton. Our appetites were excellent; we ate up entirely one hind-quarter of mutton, and wanted more.

After supper, I went with Mr. Muir and sat on a high rock, jutting into the lake. It was full moon. I never saw a more delightful scene. This little lake, one mile long and a half mile wide, is actually embosomed in the mountains, being surrounded by rocky eminences two thousand feet high, of the most picturesque forms, which come down to the very water's edge. The deep stillness of the night; the silvery light and deep shadows of the moun-



LAKE TENAYA.



tains; the reflection on the water, broken into thousands of glittering points by the ruffled surface; the gentle lapping of the wavelets upon the rocky shore—all these seemed exquisitely harmonized with each other, and the grand harmony made answering music in our hearts. Gradually the lake surface became quiet and mirror-like, and the exquisite surrounding scenery was seen double. For an hour we remained sitting in silent enjoyment of this delicious scene, which we reluctantly left to go to bed. Tenaya Lake is about eight thousand feet above sea-level. The night air, therefore, is very cool.

I noticed in many places to-day, especially as we approached Lake Tenaya, the polishings and scorings of ancient glaciers. In many places we found broad, flat masses so polished that our horses could hardly maintain their footing in passing over them. It is wonderful that in granite so decomposable these old glacial surfaces should remain as fresh as the day they were left by the glacier. But if ever the polished surface scales off, then the disintegration proceeds as usual. The destruction of these surfaces by scaling, is, in fact, continually going on. Whitney thinks the polished surface is hardened by pressure of the glacier. I cannot think so. The smoothing, I think, prevents the retention of water, and thus prevents the rotting. Like the rusting of iron, which is hastened by roughness, and still more by rust, and retarded or even prevented by cleaning and polishing, so rotting of rock is hastened by roughness, and still more by commencing to rot, and retarded or prevented by grinding down to the *sound* rock and then polishing.

To-day, while cooking midday meal, the wind was high, and the fire furious. I singed my whiskers and mustache, and badly burned my hand with boiling-hot bacon fat.

AUGUST 10.—Early start this morning for Soda Springs and Mt. Dana. Phelps and his mare entertained us while getting off this morning with an amusing bucking scene. The interesting performance ended with the grand climactic feat of flying head foremost over the head of the horse, turning a somersault in the air, and alighting safely on the back. After this exhilarating diversion, we proceeded on our way, following the trail on the right hand of the lake. Onward we go, in single file, I leading the pack, over the roughest and most precipitous trail (if trail it can be called) I ever saw. At one moment we lean forward, holding to the horse's mane, until our noses are between the horse's ears; at the next, we stand in the stirrups, with our backs leaning hard against the roll of blankets behind the saddle. Thus we pass, dividing our attention between the difficulties of the way and the magnificence of the scenery, until 12 M., when we reached Soda Springs, in the splendid meadows of the Upper Tuolumne River.

Our trail this morning has been up the Tenaya Cañon, over the divide, and into the Tuolumne Valley. There is abundant evidence of an immense former glacier, coming from Mt. Dana and Mt. Lyell group, filling the Tuolumne Valley, overrunning the divide, and sending a branch down the Tenaya Cañon. The rocks in and about Tenaya Cañon are everywhere scored and polished. We had to dismount and lead over some of these polished surfaces. The horses' feet slipped and sprawled in every direction, but none fell. A conspicuous feature of the scenery on Lake Tenaya is a granite knob, eight hundred feet high, at the upper end of the lake, and in the middle of the cañon. This knob is bare, destitute of vegetation, round and polished to the very top. It has evidently been enveloped in the icy mass, and its shape has been determined by it. We observed similar scorings and polishings on the sides of the cañon, to an equal and much greater height. Splendid view of the



THE TUOLUMNE MEADOWS AT SODA SPRINGS.



double peaks of the Cathedral, from Tenaya Lake and from the trail. Looking back from the trail soon after leaving the lake, we saw a conspicuous and very picturesque peak with a vast amphitheater, with precipitous sides, to the north, filled with a grand mass of snow, evidently the fountain of an ancient tributary of the Tenaya Glacier. We called this *Coliseum Peak*.^{*} So let it be called hereafter, to the end of time.

The Tuolumne meadow is a beautiful grassy plain of great extent, thickly enameled with flowers, and surrounded with the most magnificent scenery. Conspicuous amongst the hundreds of peaks visible are Mt. Dana, with its grand symmetrical outline, and purplish red color; Mt. Gibbs, of gray granite; Mt. Lyell and its group of peaks, upon which great masses of snow still lie; and the wonderfully picturesque group of sharp, inaccessible peaks (viz: Unicorn Peak, Cathedral Peaks, etc.), forming the Cathedral group.

Soda Springs is situated on the northern margin of the Tuolumne meadow. It consists of several springs of ice-cold water, bubbling up from the top of a low reddish mound. Each spring itself issues from the top of a small subordinate mound. The mound consists of carbonate of lime, colored with iron deposited from the water. The water contains principally carbonates of lime and iron, dissolved in excess of carbonic acid, which escapes in large quantities, in bubbles. It possibly, also, contains carbonate of soda. It is very pungent, and delightful to the taste. Before dinner we took a swim in the ice-cold water of the Tuolumne River.

About 3 P. M. commenced saddling up, intending to go on to Mt. Dana. Heavy clouds have been gathering for some time past. Low mutterings of thunder have also been heard. But we had already been so accustomed to the

^{*} This is sometimes called Tenaya Peak.

same, without rain, in the Yosemite, that we thought nothing of it. We had already saddled, and some had mounted, when the storm burst upon us. "Our provisions—sugar, tea, salt, flour, must be kept dry!" shouted Hawkins. We hastily dismounted, constructed a sort of shed of blankets and india-rubber cloths, and threw our provisions under it. Now commenced peal after peal of thunder in an almost continuous roar, and floods of rain. We all crept under the temporary shed, but not before we had gotten pretty well soaked. So much delayed that we were now debating—after the rain—whether we had not better remain here over night. Some were urgent for pushing on, others equally so for staying. Just at this juncture, when the debate ran high, a shout, "Hurrah!" turned all eyes in the same direction. Hawkins and Mr. Muir had scraped up the dry leaves underneath a huge prostrate tree, set fire and piled on fuel, and already, see! a glorious blaze! This incident decided the question at once. With a shout, we all ran for fuel, and piled on log after log, until the blaze rose twenty feet high. Before, shivering, crouching, and miserable; now, joyous and gloriously happy.

The storm did not last more than an hour. After it, the sun came out and flooded all the landscape with liquid gold. I sat alone at some distance from the camp, and watched the successive changes of the scene—first, the blazing sunlight flooding meadow and mountain; then the golden light on mountain peaks, and then the lengthening shadows on the valley; then a roseate bloom diffused over sky and air, over mountain and meadow. Oh! how exquisite! I never saw the like before. Last, the creeping shadow of night, descending and enveloping all.

The Tuolumne meadows are celebrated for their fine pasturage. Some twelve to fifteen thousand sheep are now pastured here. They are divided into flocks of about two thousand five hundred to three thousand. I was greatly

interested in watching the management of these flocks, each by means of a dog. The intelligence of the dog is perhaps nowhere more conspicuous. The sheep we bought yesterday is entirely gone — eaten up in one day. We bought another here, a fine, large, fat one. In an hour it was butchered, quartered, and a portion on the fire, cooking. After a very hearty supper, we hung up our blankets about our camp-fire to dry, while we ourselves gathered around it to enjoy its delicious warmth. By request of the party, I gave a familiar lecture, or rather talk, on the subject of glaciers, and the glacial phenomena we had seen on the way.

LECTURE ON GLACIERS AND THE GLACIAL PHENOMENA OF THE SIERRAS.

(ABSTRACT).

In certain countries, where the mountains rise into the region of perpetual snow, and where other conditions, especially abundant moisture, are present, we find enormous masses of *ice* occupying the valleys, extending far below the snow-cap, and slowly moving downward. Such moving icy extensions of the perpetual snow-cap are called *glaciers*.

It is easy to see that both the existence of glaciers and their downward motion is necessary to satisfy the demands of the great universal *Law of Circulation*. For in countries where glaciers exist, the amount of snow which falls on mountain tops is far greater than the waste of the same by melting and evaporation in the same region. The snow, therefore, would accumulate without limit if it did not move down to lower regions, where the excess is melted and returned again to the general circulation of meteoric waters.

In the Alps, glaciers are now found ten to fifteen miles long, one to three miles wide, and five hundred to six hun-

dred feet thick. They often reach four thousand feet below the snow-level, and their rate of motion varies from a few inches to several feet per day. In grander mountains, such as the Himalayas and Andes, they are found of much greater size; while in Greenland and the Antarctic continent the whole surface of the country is completely covered, two thousand to three thousand feet deep, with an *ice sheet*, molding itself on the inequalities of surface, and moving slowly seaward, to break off there into masses which form *icebergs*. The *icy* instead of *snowy* condition of glaciers is the result of pressure, together with successive thawings and freezings. Snow is thus slowly compacted into *glacier-ice*.

Although glaciers are in continual motion downward, yet the lower end, or *foot*, never reaches below a certain point; and under unchanging conditions, this point remains fixed. The reason is obvious: The glacier may be regarded as being under the influence of two opposite forces; the downward motion tending ever to lengthen, and the melting tending ever to shorten it. High up the mountain the motion is in excess, but as the melting power of sun and air increases downward, there must be a place where the motion and the melting balance each other. At this point will be found the foot. It is called the lower limit of the glacier. Its position, of course, varies in different countries, and many even reach the sea-coast, in which case icebergs are formed. *Annual* changes of temperature do not affect the position of the foot of the glacier, but *secular* changes cause it to *advance* or *retreat*. During periods of increasing cold and moisture, the foot advances, pushing before it the accumulating débris. During periods of increasing heat and dryness it retreats, leaving its previously accumulated débris lower down the valley. But whether the *foot of the glacier* be stationary, or advancing or retreating, the matter of the glacier, and therefore all the débris

lying on its surface, is in continual motion downward. Since glaciers are limited by melting, it is evident that a river springs from the foot of every glacier.

Moraines.—On the surface, and about the foot of glaciers, are always found immense piles of heterogeneous *débris*, consisting of rock fragments of all sizes, mixed with earth. These are called *moraines*. On the surface, the most usual form and place is a long heap, often twenty to fifty feet high, along each side, next the bounding cliffs. These are called *lateral moraines*. They are ruins of the crumbling cliffs on each side, drawn out into continuous line by the motion of the glacier. If glaciers are without tributaries, these lateral moraines are all the *débris* on their surface; but if glaciers have tributaries, then the *two* interior lateral moraines of the tributaries are carried down the middle of the glacier, as a *medial moraine*. There is a medial moraine for every tributary. In complicated glaciers, therefore, the whole surface may be nearly covered with *débris*. All these materials, whether lateral or medial, are borne slowly onward by the motion of the glacier, and finally deposited at its foot, in the form of a huge, irregularly crescentic pile of *débris* known as the *terminal moraine*. If a glacier runs from a rocky gorge out on a level plain, then the lateral moraines may be dropped on either side, forming parallel *débris* piles, confining the glacier.

Laws of Glacial Motion.—Glaciers do not *slide* down their beds, like solid bodies, but *run* down in the manner of a body half solid, half liquid; *i. e.*, in the manner of a *stream of stiffly viscous substance*. Thus, while a glacier slides over its bed, yet the upper layers move faster, and therefore slide over the lower layers. Again, while the whole mass moves down, rubbing on the bounding sides, yet the middle portions move faster, and therefore slide on the marginal portions. Lastly, while a glacier moves over

smaller inequalities of bed and bank like a solid, yet it conforms to and molds itself upon the *larger* inequalities, like a liquid. Also, its motion down steep slopes is greater than over level reaches. Thus, glaciers like rivers, have their *narrows* and their *lakes*, their rapids and their stiller portions, their *deeps* and their *shallows*. In a word, a glacier is a *stream*, its motion is *viscoid*, and, for the practical purposes of the geologist, it may be regarded as a very stiffly viscous body.

Glaciers as a Geological Agent.—Glaciers, like rivers, *wear away* the surfaces over which they pass; *transport* materials and *deposit* them in their course, or at their termination. But in all these respects the effects of glacial action are very characteristic, and cannot be mistaken for those of any other agent.

Erosion.—The cutting or wearing power of glaciers is very great; not only on account of their great weight, but also because they carry, fixed firmly in their lower surfaces, and therefore between themselves and their beds, rock fragments of all sizes, which act as their graving tools. These fragments are partly torn off from their rocky beds in their course, but principally consist of top-débris, which find their way to the bottom through fissures, or else are engulfed in the viscous mass on the sides. Armed with these graving tools, a glacier behaves towards smaller inequalities like a solid body, planing them down to a *smooth surface*, and marking the smooth surface thus made with *straight parallel scratches*. But to large inequalities it behaves like a viscous liquid, conforming to their surfaces, while it smooths and scratches them. It molds itself upon large prominences and scoops out large hollows, at the same time smoothing, rounding and scoring them. These smooth, rounded, scored surfaces, and these scooped-out rock basins, are very characteristic of glacial action. We have passed over many such smooth surfaces this morning. The scooped-out rock

basins, when left by the retreating glacier, become beautiful lakes. Lake Tenaya is probably such a lake.

Transportation.—The carrying power of river currents has a definite relation to velocity. To carry rock fragments, of many tons weight, requires an almost incredible velocity, Glaciers, on the contrary, carry on their surfaces, with equal ease, fragments of all sizes, even up to hundreds of tons weight. Again, bowlders carried by water currents are always bruised and rounded, while glaciers carry them safely and lay them down in their original angular condition. Again, river currents always leave bowlders in *secure* position, while glaciers may set them down gently, by the melting of the ice, in *insecure* positions, as *balanced stones*. Therefore *large angular* bowlders, different from the country rock, and especially if in *insecure* positions, are very characteristic of glacial action.

Deposit—Terminal Moraine.—As already seen, all materials accumulated on the surface of a glacier, or pushed along on the bed beneath, find their final resting-place at the foot, and there form the *terminal moraine*. If a glacier recedes, it leaves its terminal moraine, and makes a new one at the new position of its foot. Terminal moraines, therefore, are very characteristic signs of the former position of a glacier foot. They are recognized by their irregular crescentic form, the mixed nature of their materials, and the entire want of stratification or sorting. Behind the terminal moraines of retired glaciers accumulate the waters of the river which flows from its foot, and thus again, form lakes. Glacial lakes, *i. e.*, lakes formed by the action of former glaciers are, therefore, of two kinds, viz: (1) The filling of scooped-out rock basins; (2) the accumulation of water behind old terminal moraines. The first are found, usually, high up; the second, lower down the old glacial valleys.

Glacial Epoch in California.—It is by means of these signs that geologists have proved that at a period very

ancient in human but very recent in geological chronology, glaciers were greatly extended in regions where they still exist, and existed in great numbers and size in regions where they no longer exist. This period is called the *Glacial Epoch*. Now, during this glacial epoch, the whole of the high Sierra region was covered with an ice-mantle, from which ran great glacial streams far down the slopes on either side. We have already seen evidences of some of these ancient glaciers on *this*, the western, slope. After crossing Mono Pass, we will doubtless see evidences of those which occupied the eastern slope. In our ride yesterday and to-day, we crossed the track of some of these ancient glaciers. From where we now sit, we can follow with the eye their pathways. A great glacier (the Tuolumne Glacier), once filled this beautiful meadow, and its icy flood covered the spot where we now sit. It was fed by several tributaries. One from Mt. Lyell, another from Mono Pass and still another from Mount Dana, which, uniting just above Soda Springs, the swollen stream enveloped yonder granite knobs five hundred feet high, standing directly in its path, smoothing and rounding them on every side, and leaving them in form like a turtle's back; then coming farther down overflowed its banks at the lowest point of yonder ridge—one thousand feet high—which we crossed this morning, and after sending an overflow stream down Tenaya Cañon the main stream passed on down the Tuolumne Cañon into and beyond Hetch Hetchy Valley. From its head fountain, in Mt. Lyell, this glacier may be traced forty miles.

The overflow branch which passed down the Tenaya Cañon, after gathering tributaries from the region of Cathedral Peaks, and enveloping, smoothing, and rounding the grand granite knobs which we saw this morning just above Lake Tenaya, scooped out that lake basin, and swept on its way to the Yosemite. There it united with other streams

from Little Yosemite and Nevada Cañons, and from Illilouette, to form the great Yosemite Glacier, which probably filled that valley to the brim and passed on down the cañon of the Merced. This glacier, in its subsequent retreat, left many imperfect terminal moraines, which are still detectable as rough *débris* piles, just below the meadows. Behind these moraines accumulated water, forming lakes, which have gradually filled up and formed meadows. Some, as Mirror Lake, have not yet filled up. The meadows of Yosemite, and the lakes and meadows of Tenaya Fork, upon which our horses grazed while we were at University Camp, were formed in this way. You must have observed that these lakes and meadows are separated by higher ground, composed of coarse *débris*. All the lakes and meadows of this High Sierra region were formed in this way. The region of good grazing is also the region of former glaciers.

Erosion in High Sierra Region.—The erosion to which this whole High Sierra region has been subjected, in geological times, is something almost incredible. It is a common popular notion that mountain peaks are *upheaved*. No one can look about him observantly in this high Sierra region, and retain such a notion. Every peak and valley now within our view—all that constitutes the grand scenery upon which we now look, is the result wholly of erosion—of *mountain sculpture*. Mountain chains are, indeed, formed by igneous agency; but these are afterwards sculptured into forms of beauty. But even this gives as yet no adequate idea of the immensity of this erosion; not only are all the grand peaks now within view, Cathedral Peaks, Unicorn Peak, Mt. Lyell, Mt. Gibbs, Mt. Dana, the result of simple inequality of erosion, but it is almost certain that the slates which form the foothills, and over whose upturned edges we passed, from Snelling to Clark's, and whose edges we again see, forming the highest crests on the very margin

of the eastern slope, originally covered the granite of this whole region many thousand feet deep. Erosion has removed it entirely, and, bitten deep into the underlying granite. Now, you are not to imagine that the whole, but certainly a large portion of this erosion, and the final touches of this sculpturing, has been accomplished by the glacial action which we have endeavored to explain.

About 9 P. M., our clothing still damp, we rolled ourselves in our damp blankets, lay upon the still wet ground, and went to sleep. I slept well and suffered no inconvenience.

To any one wishing really to enjoy camp life among the high Sierra, I know no place more delightful than Soda Springs. Being about nine thousand feet above the sea, the air is deliciously cool and bracing. The water, whether of the spring or of the river, is almost ice-cold, and the former a gentle tonic. The scenery is nowhere more glorious. Add to this, inexhaustible pasturage for horses, and plenty of mutton, and what more can pleasure seekers want?

AUGUST 11.—As we intended going only to the foot of Mt. Dana, a distance of about eleven miles, we did not hurry this morning. The mutton gotten yesterday must be securely packed; we did not get started until 9 A. M. Trail very blind. Lost it a dozen times, and had to scatter to find it each time. Saw again this morning magnificent evidences of the Tuolumne Glacier. Among the most remarkable, several smooth, rounded knobs of granite, eight hundred to one thousand feet high, with long slope up the valley, and steep slope down the valley, evidently their whole form determined by an enveloping glacier.

About 2 P. M., as we were looking out for a camping-ground, a thunder-storm again burst upon us. We hurried on, searching among the huge boulders (probably

glacial boulders), to find a place of shelter for our provisions and ourselves. At last we found a huge boulder which overhung on one side, leaning against a large tree. The roaring of the coming storm grows louder and louder, the pattering of rain already commences. "Quick! quick!!" In a few seconds the pack was unsaddled, and provisions thrown under shelter. Then rolls of blankets quickly thrown after them; then the horses unsaddled and tied; then, at last, we ourselves, though already wet, crowded under. It was an interesting and somewhat amusing sight. All our provisions and blanket rolls and eleven men packed away, actually piled upon one another, under a rock which did not project more than two and a half feet. I wish I could draw a picture of the scene; the huge rock with its dark recess; the living, squirming mass, piled confusedly beneath; the magnificent forest of grand trees; the black clouds; the constant gleams of lightning, revealing the scarcely visible faces; the peals of thunder, and the floods of rain, pouring from the rock on the projecting feet and knees of those whose legs were inconveniently long, or even on the heads and backs of some who were less favored in position.

In about an hour the storm passed, the sun again came out, and we selected camp. Beneath a huge prostrate tree we soon started a fire, and piled log upon log, until the flame, leaping upwards, seemed determined to overtop the huge pines around. Ah! what a joy is a huge camp-fire! not only its delicious warmth to one wet with rain in this high cool region, but its cheerful light, its joyous crackling and cracking, its frantic dancing and leaping! How the heart warms, and brightens, and rejoices, and leaps, in concert with the camp-fire!

We are here nearly ten thousand feet above sea-level. Our appetites are ravenous. We eat up a sheep in a day; a sack (one hundred pounds) of flour lasts us five or six

days. Nights are so cool that we are compelled to make huge fires, and sleep near the fire to keep warm.

Our camp here is a most delightful one, in the midst of grand trees and huge bowlders — a meadow hard by, of course, for our horses. By stepping into the meadow, we see looming up very near us, on the south, the grand form of Mt. Gibbes, and on the north, the still grander form of Mt. Dana. After supper, and dishwashing, and horse-tending, and fire-replenishing, the young men gathered around me, and I gave them the following

LECTURE ON DEPOSITS IN CARBONATE SPRINGS.

You saw yesterday and this morning the bubbles of gas which rise in such abundance to the surface of Soda Spring. You observed the pleasant pungent taste of the water, and you have doubtless associated both of these with the presence of carbonic acid. But there is another fact which probably you have not associated with the presence of this gas, *viz.*, the *deposit of a reddish substance*. This reddish substance, which forms the mound from the top of which the spring bubbles, is carbonate of lime, colored with iron oxide. This deposit is very common in carbonated springs. I wish to explain it to you.

Remember then: 1st, that lime carbonate and metallic carbonates are insoluble in pure water, but slightly soluble in water containing carbonic acid; 2d, that the amount of carbonates taken up by water is proportionate to the amount of carbonic acid in solution; 3d, that the amount of carbonic acid which may be taken in solution is proportioned to the pressure. Now, all spring water contains a small quantity of carbonic acid, derived from the air, and will therefore dissolve limestone (carbonate of lime); but the quantity taken up by such waters is so small that it will not deposit except by drying. Such are not called carbonated springs.

But there are, also, *subterranean* sources of carbonic acid, especially in volcanic districts. Now, if percolating water come in contact with such carbonic acid—being under heavy pressure—it takes up larger quantities of the gas. If such waters come to the surface, the pressure being removed, the gas escapes in bubbles. This is a carbonated spring.

If, further, the subterranean water thus highly charged with carbonic acid comes in contact with limestone or rocks of any kind containing carbonate of lime, it dissolves a proportionately large amount of this carbonate, and when it comes to the surface, the escape of the carbonic acid causes the limestone to deposit, and hence this material accumulates immediately about the spring, and in the course of the stream issuing from the spring.

The kind of material depends upon the manner of deposit and upon the presence or absence of iron. If the deposit is tumultuous, the material is *spongy*, or even pulverulent; if quiet, it is *dense*. If no iron be present, the deposit is white as marble; but if iron be present, its oxidation will color the deposit yellow, or brown, or reddish. If the amount of iron be variable, the stone formed will be beautifully striped. Suisun marble is an example of a beautifully striped stone, deposited in this way in a former geological epoch.

I have said that such springs are most common in volcanic districts. They are, therefore, most commonly warm. Soda Springs, however, is not in a volcanic district. In our travels in the volcanic region on the other side of the Sierra, we will find, probably, several others. At one time these springs were far more abundant in California than they are now.

AUGUST 12.—We had cooked bread yesterday for our breakfast and lunch to-day, in anticipation of our ascent of

Mt. Dana. We had this morning only to cook meat. This takes but little time. We made an early start, therefore. Rode our horses up as far as the timber extends, staked them out in little green patches of rich grass, very abundant on the mountain slopes, and then commenced the real ascent on foot. I think we ascended about 3,000 feet after leaving our horses. Saw a splendid buck—but alas! Cobb has left his rifle. Mt. Dana, as seen from this side, is of a very regular, conical form, entirely destitute of soil, and therefore of vegetation; in fact, from top to bottom, a mere loose mass of rock fragments—metamorphic sandstone and slates. The slope is, I think, forty degrees; the rock fragments, where small, give way under the foot, and roll downwards; if large, they are difficult to climb over. The ascent is difficult and fatiguing in the extreme. The danger, too, to those below, from bowlders loosened by the feet of those above, is very great. A large fragment, at least one hundred pounds, thus loosened by Mr. Bolton, came thundering down upon me with fearful velocity, before I was aware. I had no time to get out of the way; in fact, my own footing was precarious. I opened my legs, it passed between, and bounded on its way down.

There being no trail, each man took his own way. The young men were evidently striving to see who could be up first. I took my steady, even way, resting a moment from time to time. My progress illustrated the fable of the hare and tortoise. I was the third man on the top. Mr. Muir and Pomroy alone had gotten there before me. I really expected to find the whole party there.

The view from the top is magnificent beyond description. To the southwest, the sharp, strangely picturesque peaks of the Cathedral group. To the south, in the distance, Mt. Lyell group, with broad patches of snow on their slopes; and near at hand, the bare gray mass of Mt. Gibbs. To the north, the fine outline of Castle Peak, rising above and

dominating the surrounding summits; and to the east, almost at our feet, the whole interior valley, including Lake Mono, with its picturesque islands and volcanoes. Stretching away to the west, valleys with grassy meadows and lakes separated by low wooded ridges. I could count thirty to fifty of these lakes, and meadows without number. These meadows and lakes and ridges suggest glacier beds, with moraines, stretching westward down the Sierra slope.

As already stated, the whole mountain is superficially a mass of loose rock fragments. I saw the rock *in situ* only in one place, but this was a magnificent section. About two-thirds way up, the bed-rock appears as a perpendicular crag, nearly one hundred feet high. It is here a very distinctly and beautifully stratified sand-stone, and in a perfectly *horizontal* position. The slope on the western and southwestern side is regular and about forty degrees, but when we arrived on the top we found that on the east and northeast the slope is very precipitous, forming an immense amphitheater, in which lay immense stores of snow, and in one place we found nestled a clear, deep blue lake, apparently formed by the melting snow. This great snow-field extends a little over the gentle slope by which we ascended. For the last five hundred to one thousand feet we ascended the mountain over this snow. Mt. Dana is thirteen thousand two hundred and twenty-seven feet high. I did not observe any remarkable effect of diminished density of atmosphere upon respiration or circulation. The beating of the heart was a little troublesome. I had to stop frequently to allow it to become quiet; but this seemed to me as bad or worse near the beginning of the climb than near the top. It seemed only more difficult to get my "second wind," as it is called, than usual.

We took cold lunch on the top of the mountain, and commenced our descent, which was less fatiguing, but much more dangerous and trying than the ascent. The shoes of

several of the party were completely destroyed. Mine still hold out. Came back to camp at 2 P. M., tired but not exhausted. Soon after reaching camp, we again had thunder and rain. We all huddled with our provisions and blankets again under our rock shed. There was but a sprinkle this time, however, though much threatening of wind and thunder.

After supper we again built up an immense camp-fire. Now, while I write, the strong light of the blazing camp-fire is thrown upon the tall tamarack trees, and upon the faces of the young men, engaged in various ways. I wish I could draw a picture of the scene now presented: the blazing fire of huge piled logs; the strongly illuminated figures of the party; the intense blackness of sky and forest. Supper is just over. Mr. Stone is squatting on the ground, engaged in washing up dishes. Mr. Linderman, who is cook to-day, is lying on his back, kicking up his heels, and regarding Mr. Stone with intense satisfaction. His work is over, while Stone's is just begun. Mr. Muir is earnestly engaged hollowing out a place under a huge pine-tree, which he intends to make his resting-place for the night. Captain is lying down flat on his back, with his clasped hands under his head and his eyes closed. Pomroy is sitting in the strong light of the fire, writing his journal; he is this moment scratching his cropped poll for an idea. Bolton, Phelps, and Perkins are sitting together near the fire, Bolton enjoying his cigarette, and Phelps and Perkins chatting. Cobb is just returning with another log for the fire. Hawkins has been looking after his horse, and is just returning. I am observing the scene, and jotting down these crude notes.

We will see Mono Lake to-morrow. Before going to bed, therefore, the party gathered about the fire, and by request I gave them the following lecture on the formation of salt and alkaline lakes.

LECTURE ON SALT AND ALKALINE LAKES.

Salt lakes may originate in two general ways: either by the isolation of a portion of sea-water, or else by the indefinite concentration of ordinary river water in a lake without an outlet. The great Salt Lake, and all the other salt lakes scattered over the desert on the other side of the Sierra, are possibly formed by the first method. It is probable that at a comparatively recent geological epoch the whole of the salt and alkaline region on the other side of the Sierra, which we will see to-morrow, was covered by an extension of the sea from the Gulf of California. When this was raised into land, portions of sea water were caught up and isolated in the hollows of the uneven surface. The lakes thus formed have since greatly diminished by drying away, as is clearly shown by the terraces or old water levels far beyond and above the present limits; and their waters have become saturated solutions of the saline matters contained in sea-water.*

The Dead Sea, and many other salt lakes and brine pools in the interior of Asia, have probably been formed in the same way. But the Caspian Sea is probably an example of the second method of formation, *i. e.*, by concentration of river water. The reason for thinking so is, that old beach marks, or terraces, show a great drying away of the lake, and yet the water is still far less salt than sea water.

Alkaline lakes are formed, and can be formed, only by the second method, *viz.*, by indefinite concentration of river water by evaporation in a lake without an outlet. Such concentration, therefore, may form either a salt or an alkaline lake. Whether the one or the other kind of lake

* More recent observations render it almost certain that Salt Lake and other lakes in the basin region were formed by the concentration of river water. Some of these lakes (*e. g.*, Pyramid Lake, Walker Lake, etc.) are much fresher than sea-water.—(December, 1899.)

results, depends wholly upon the composition of the river water. If chlorides predominate, the lake will be salt; but if alkaline carbonates predominate, it will be alkaline.

Perhaps some of you will be surprised that the pure fresh water of mountain streams can produce salt or alkaline lakes. I must therefore try to explain.

We speak of spring water as pure and fresh; it is so comparatively. Nevertheless, all spring water, and therefore all river water, contains small quantities of saline matters derived from the rocks and soils through which they percolate. Suppose, then, the drainage of any hydrographical basin to accumulate in a lake. Suppose, farther, that the *supply* of water by rivers be greater than the *waste* by evaporation from the lake surface. It is evident that the lake will rise, and if the same relation continues, it will continue to rise until it finds an outlet in the lowest part of the rim, and is discharged into the ocean or some other reservoir. Such a lake will be *fresh*; *i. e.*, it will contain only an imperceptible quantity of saline matter.

But if, on the other hand, at any times the *waste* by evaporation from the lake surface should be equal to the supply by rivers, the lake would not rise, and therefore would not find an outlet. Now the salting process will commence. The waters which flow in contain a little, be it ever so little, of saline matter. All this remains in the lake, since evaporation carries off only distilled water. Thus, age after age saline matters are leached from rocks and soils, and accumulated in the lake, which, therefore, must eventually become either salt or alkaline.

Thus, whether lakes are saline or fresh depends on the presence or absence of an outlet, and the presence or absence of an outlet depends on the relation of supply by rain to waste by evaporation, and this latter depends on the climate. Saline lakes cannot occur except in very dry climates, and these lakes are rare, because on most land surfaces the rain-

fall far exceeds the evaporation, the excess being carried to the sea by rivers. Only in wide plains, in the interior of continents, do we find the climatic conditions necessary to produce salt lakes.

I have shown the conditions necessary to the formation of a salt lake by concentration of river water. Now, the very same conditions control the existence of salt lakes, however they may have originated. Even in the case of a salt lake formed by the isolation of a portion of sea-water, whether it remain salt or become fresh will depend wholly on the conditions discussed above.

Suppose, for example, a portion of sea-water be isolated by an upheaval of the sea-bed; now, if the supply of water to this lake by rivers be greater than the waste by evaporation from the surface, the lake will rise, overflow, and discharge into the sea or other reservoir; the salt water will be slowly rinsed out, and the lake will become fresh. But if the evaporation should equal the supply, the lake will not find an outlet, and will remain salt, and will even increase in saltiness until it begins to deposit.

Thus, if the Bay of San Francisco should be cut off from the sea at the Golden Gate, it would form a fresh lake, for the water running into it by the Sacramento River is far greater than the evaporation from the bay. So the Black Sea, and the Baltic Sea, as above shown by the comparative freshness of the waters, would form fresh lakes. But the Mediterranean, as shown by the great saltiness of its waters, would certainly remain salt, and become increasingly salt. We have the best reasons to believe that Lake Champlain, since the glacial epoch, was an arm of the sea. It has become fresh since it became separated.

Saltiness of the ocean.—Thus, then, we see that the one condition which determines the existence of salt and alkaline lakes is the absence of an outlet. Now, the ocean, of course, has no outlet; the ocean is the final reservoir of

saline matters leached from the earth. Hence, although the saltiness of the ocean is a somewhat different problem from that of salt lakes, yet it is almost certain that the saline matters of the ocean are the accumulated results of the leachings of the rocks and soils by circulating waters throughout all geological times.

During my travels through the Sierra I have made many observations on rocks and mountains. One or two of these I think worthy of mention. First, I have seen everywhere the strongest confirmation of the view that granite and granitic rocks may be but the final term of metamorphism of sedimentary rocks. In Yosemite I could trace every stage of gradation from granite into gneiss, and since leaving Yosemite, from gneiss into impure sandstones. On Mt. Dana sandstones are easily traced into gneiss, or even eurite, and slate into a crystalline rock, undistinguishable from diorite or other traps.

Second, No one who examines the forms of the peaks of the Sierra can come to any other conclusion than that all the mountain forms seen here are the result of *erosion*. Standing at Soda Springs and gazing upon the strange forms of Cathedral Group, the conviction is forced upon the mind that these were not upheaved, but simply left as more resisting fragments of an almost inconceivable erosion — fragments of a denuded plateau. The strange ruggedness of the forms, the inaccessible peaks and pinnacles, have been the result of the very decomposable nature of the granite. Mt. Dana, with its more regular form, consists of more resistant slates. The evidence that Mt. Dana has been formed entirely by erosion is, I conceive, complete. As already stated, Mt. Dana is composed of undisturbed horizontal strata. The grand bulge of a great mountain chain is probably produced by the shrinkage of the earth; the foldings and tiltings of strata in mountain

chains by the same cause; but the actual forms which constitute scenery are purely the result of aqueous erosion. Metamorphism is, I believe, always produced in deeply buried rocks by heat, water, and pressure. The universal metamorphism of the rocks in the Sierra is therefore additional evidence of the immensity of the erosion which brings these to the surface.

Since leaving Yosemite we have seen no houses; in fact, no human beings but a few shepherds. As the flocks require to be driven from one pasture to another, these men live only in hastily constructed sheds, covered with boughs. In this shepherd's life there may be something pleasant when viewed through the imagination only; but in reality it is enough to produce either imbecility or insanity. The pleasant pictures drawn by the poets, of contemplative wisdom and harmless enjoyment, of affectionate care of the flock, of pensive music of pipes,—these possibly, probably, once did exist; but certainly they do not exist now, at least in California.

AUGUST 13.—Cold last night. We had to sleep near the fire, and keep it up during the night. Considerable frost this morning, for we are in the midst of the snows. We got up early, feeling bright and joyous, and enjoyed our breakfast as only mountaineers can. Over Mono Pass, and down Bloody Cañon to-day. I really dread it, for my horse's sake. Even well-shod horses get their feet and legs cut and bleeding in going down this cañon. My horse, since leaving Yosemite, has lost three shoes, and has already become very tender-footed. Got off by 6 A. M. Sorry, very sorry, to leave our delightful camp here. In commemoration of the delightful time we have spent here, we name it "Camp Dana."

The trail to the summit is a very gentle ascent, the whole way along the margin of a stream. Distance, three or

four miles. Saw a deer, but Cobb was not on hand. On the very summit, ten thousand seven hundred feet high, there is a marshy meadow, from which a stream runs each way: one east, into the Tuolumne, along which we had ascended; the other west, down Bloody Cañon into Mono Lake, along which we expect to descend. Right on the Summit, and in Bloody Cañon, we found great masses of snow. The trail passes by their edges and over their surfaces. The trail down Bloody Cañon is rough and precipitous beyond conception. It is the terror of all drovers and packers across the mountains. It descends four thousand feet in two or three miles, and is a mere mass of loose fragments of sharp slate. Our horses' legs were all cut and bleeding before we got down. I really felt pity for my horse, with his tender feet. We all dismounted and led them down with the greatest care. In going down we met a large party of Indians, some on horseback, and some on foot, coming up. We saluted them. In return they invariably whined, "Gie me towaca," "Gie me towaca." They were evidently incredulous when told that none of the party chewed.

The scenery of Bloody Cañon is really magnificent, and in a scientific point of view this is the most interesting locality I have yet seen. Conceive a narrow, winding gorge, with black, slaty precipices of every conceivable form, fifteen hundred to two thousand feet high on either side. As the gorge descends precipitously, and winds from side to side, we often look from above down into the most glorious amphitheater of cliffs, and from time to time beyond, upon the glistening surface of Lake Mono, and the boundless plains, studded with volcanic cones. About one-third way down, in the center of the grandest of these amphitheatres, see! a deep, splendidly clear, emerald-green lake, three or four times the size of Mirror Lake. It looks like an artificial basin, for its shores are everywhere hard, smooth,

polished rock; especially the rim at the lower side is highly polished and finely striated. There can be no doubt that this lake basin has been scooped out by a glacier which once descended this cañon. In fact, glacial action is seen on every side around this lake, and all the way down the cañon and far into the plains below. The cliffs on each side are scored and polished to the height of one thousand feet or more; projecting knobs in the bottom of the cañon are rounded and scored and polished in a similar manner.

After we had descended the steep slope, and had fairly escaped from the high, rocky walls of Bloody Cañon proper; after we had reached the level plain and had prepared ourselves for an extensive view, we found ourselves still confined between two huge parallel ridges of *débris* five hundred feet high and only half a mile apart, and extending five or six miles out on the plain.

These are the *lateral moraines* of a glacier which once descended far into the plain towards Mono Lake. A little below the commencement of these moraines, in descending, we found a large and beautiful lake filling the whole cañon. Below this lake the lateral moraines on either side send each a branch which meet each other, forming a crescentic cross-ridge through which the stream breaks. This is evidently a *terminal* moraine, and the lake has been formed by the damming up of the water of the stream by this moraine barrier.

Below this, or still farther on the plain, I observed several other terminal moraines, formed in a similar way, by curving branches from the lateral moraines. Behind these are no lakes, but only marshes and meadows. These meadows are evidently formed in the same way as the lake; in fact, were lakes subsequently filled up by deposit.

After getting from these lateral moraines fairly out on the plains, the most conspicuous objects which strike the eye are the extinct volcanoes. There are, I should think, at least

twenty of them, with cones and craters as perfect as if they erupted yesterday. Even at this distance, I see that their snow-white, bare sides are composed of loose volcanic ashes and sand, above which projects a distinct rocky crater-rim, some of dark rock, but most of them of light-colored, probably, pumice rock. Magnificent views of these cones and of Mono Lake are gotten from time to time, while descending Bloody Cañon. The cones are of all heights, from two hundred to twenty-seven hundred feet above the plain, and the plain itself about five thousand feet above sea-level.

We stopped for lunch at a cabin and meadow—a cattle ranch—about five miles from the lake. While our horses grazed, we cooked our dinner as usual, and then proceeded three miles and camped in a fine meadow on the banks of a beautiful stream—Rush Creek.

In riding down to our camp, I observed the terraces of Lake Mono, former water-levels, very distinctly marked, four or five in number. The whole region about Lake Mono, on this side, is covered with volcanic ashes and sand. It is the only soil except in the meadows. Even these seem to have the same soil, only more damp, and therefore more fertile. Scattered about, larger masses of pumice and obsidian are visible. Except in the meadows and along streams, the only growth is the sagebrush. Just before reaching camp, Mr. Muir and myself examined a fine section, made by Rush Creek, of lake and river deposit, beautifully stratified. It consists below of volcanic ashes, carried as sediment and deposited in the lake, and is, therefore, a true lake deposit, and beautifully stratified. Above this is a drift pebble deposit; the pebbles consisting of granite and slate from the Sierra. Above this again, are volcanic ashes and sand, *unstratified*, probably blown ashes and sand, or else ejected since the drift. We have here therefore, certain evidence of eruptions before the drift, and possibly, also, after.

In the picture of the view from Mono Lake, I have yet said nothing about the Sierra. The general view of the range from this, the Mono, side is far finer than from the other side. The Sierra rises gradually on the western side for fifty or sixty miles. On the Mono, or eastern, side it is precipitous, the very summit of the range running close to the valley. From this side, therefore, the mountains present a sheer elevation of six or seven thousand feet above the plain. The sunset view of the Sierra, from an eminence near our camp, this evening, was, it seems to me, by far the finest mountain view I have ever in my life seen. The immense height of the chain above the plain, the abruptness of the declivity, the infinitely diversified forms, and the wonderful sharpness and ruggedness of the peaks, such as I have seen nowhere but in the Sierra, and all this strongly relieved against the brilliant sunset sky, formed a picture of indescribable grandeur. As I turn around in the opposite direction, the regular forms of the volcanoes, the placid surface of Lake Mono, with its picturesque islands, and far away in the distance the scarcely visible outlines of the White Mountains, pass in succession before the eye. I enjoyed this magnificent panoramic view until it faded away in the darkness.

From this feast I went immediately to another, consisting of excellent bread, and such delicious mutton chops! If any restaurant in San Francisco could furnish such, I am sure it would quickly make a fortune. Some sentimentalists seem to think that these two feasts are incompatible; that the enjoyment of the beautiful is inconsistent with voracious appetite for mutton. I do not find it so.

After supper I again went out to enjoy the scene by night. As I gazed upon the abrupt slope of the Sierra, rising like a wall before me, I tried to picture to myself the condition of things during the glacial epoch. The long western slope of the Sierra is now occupied by long, com-

plicated valleys, broad and full of meadows, while the eastern slope is deeply graven with short, narrow, steep ravines. During glacial times, therefore, it is evident that the western slope was occupied by long, complicated glaciers, with comparatively sluggish current; while on the east, short, simple, parallel ice-streams ran down the steep slope, and far out on the level plain. On each side of these protruded icy tongues, the débris brought down from the rocky ravines was dropped as parallel moraines. Down the track of one of these glaciers, and between the outstretched *moraine arms*, our path lay this morning.

AUGUST 14—SUNDAY.—I have not before suffered so much from cold as last night; yet yesterday the sun was very hot. No grand forests to protect us from wind and furnish us with logs for camp-fire; only sagebrush on the plains, and small willows on the stream-banks. The winds blow furiously from the Sierra down the cañons, upon the plains. Got up at 4 A. M.; could n't sleep any more. After breakfast, went to visit the volcanic cones in the vicinity. The one we visited was one of the most perfect, and at the same time one of the most accessible. It was not more than one hundred and fifty or two hundred feet above the level of the sandy plain on which it stands.

I was very greatly interested in this volcano. It seems to me that its structure clearly reveals some points of its history. It consists of two very perfect cones and craters, one within the other. The outer cone, which rises directly from the level plain to a height of two hundred feet, is composed wholly of volcanic sand, and is about one mile in diameter. From the bottom and center of its crater rises another and much smaller cone of lava to a little greater height. We rode up the outer sand cone, then around on the rim of its crater, then down its inner slope to the bottom; tied our horses to sagebrush at the base of the inner

lava-cone, and scrambled on foot into its crater. Standing on the rim of this inner crater, the outer rises like a rampart on every side.

I believe we have here a beautiful example of cone-and-rampart structure, so common in volcanoes elsewhere; the rampart, or outer cone, being the result of an older and much greater eruption, within the wide, yawning crater, of which by subsequent lesser eruption the smaller cone was built.*

Mr. Muir is disposed to explain it differently. He thinks that this was once a much higher single cone, lava at top and sand on the slopes, like most of the larger cones in this vicinity; and that after its last eruption it suffered *engulfment*; *i. e.*, its upper rocky portion has dropped down into its lower sandy portion.

The lava of this volcano is mostly pumice and obsidian, sometimes approaching trachyte. It was of all shades of color, from black to white, sometimes beautifully veined, like slags of an iron furnace; and of all physical conditions, sometimes vesicular, sometimes glassy, sometimes stony. Wrinkled fusion-surfaces were also abundant. Again, I believe I can fix the date of the last eruption of this volcano. I found on the outer, or ash-cone, several unmistakable drift *pebbles of granite*. At first I thought they might be the result of accidental deposit; but I found, also, several within the *lava crater*. These were reddened and semi-fused by heat. There can be no doubt, therefore, that the last eruption of this volcano was since the drift; it broke through a layer of drift deposit, and threw out the drift pebbles. Some fell back into the crater.

Mr. Muir took leave of us within the crater of this volcano. He goes to-day to visit some of the loftier cones. I would gladly accompany him, but my burnt hand has

* I again in 1875 visited this region. My observations on several of the volcanoes confirmed my first impressions.

to-day become inflamed, and is very painful; the climb of twenty-seven hundred feet, over loose, very loose sand, will be very fatiguing, and the sun is very hot. In spite of all this, I had determined to go, but the party are impatient of delays.

I was really sorry to lose Mr. Muir from our party. I have formed a very high opinion of, and even a strong attachment for him. He promises to write me if he observes any additional facts of importance.

We came back to camp about 12 M., and while dinner was preparing, took a delightful swim in the river which runs here by our camp into the lake. Several Indians visited us while at dinner. This is a favorite time for such visits. They know they will get something to eat. Two younger Indians were full of life and good-nature, but one old wrinkled fellow was very reticent, and stood much upon his dignity. He had a beautiful bow and several arrows. We put up some bread and the younger ones shot for it, but the old Indian would take no notice of it, and even seemed to treat the idea with contempt. He evidently belongs to the "Old Regime." He remembers the time when the *noble* red man had undisputed possession of this part of the country.

About 2 P. M. we started for Alliton's, a small house on the west side of the lake, and about twelve miles distant. Here I hope to have my horse temporarily shod. In this hope I have picked up and preserved three horseshoes. If we can find nails at Alliton's, Hawkins will shoe my horse. If not, I know not what I shall do, for my horse is so lame he can hardly get on at all to-day. Had it not been for the lameness of my horse, I would have enjoyed the evening ride greatly. The trail runs close along the margin of the lake, sometimes in the very water, sometimes rising on the slopes of the steep mountains, which come down to the very water's edge. From the sides of these mountains the

view of the lake and mountains was very fine. The volcanic character of the islands in the lake was very evident, and their craters were quite distinct. It is said that evidences of feeble volcanic activity still exist in the form of steam-jets, hot springs, etc. I am anxious to visit these islands, and will do so if I can. My horse was so lame that I made very slow progress, and lagged behind several miles. When I reached Alliton's I found the house empty — Alliton not at home, and the party gone to a house about a mile or two farther on! Alas! what shall I do for my horse? Soon after leaving Alliton's, however, I met Hawkins, riding Cobb's pony bareback. He said he had found some shoe-nails at Alliton's, and he would shoe my horse. We therefore exchanged horses; I went on, and he back to Alliton's, and shod my horse very nicely.

On my way along the shores of the lake I observed thousands of birds; blackbirds, gulls, ducks, magpies, stilts, sandpipers. The sandpipers I never saw alight on the shore, but only on the water. They swam, rose in flocks, settled on the water exactly like true ducks.* Will not these in time undergo a Darwinian change into web-footers? These birds seem to collect in such numbers to feed upon the swarms of flies which frequent the shores. The numbers of these is incredible. I saw them in piles three or four inches thick on the water, and in equal piles thrown up dead on the shore. The air stank with them. These flies come here to spawn. Their innumerable larvæ form, I understand, the principal food of the Indians during a portion of the year.† All about the margin of the lake, and standing in the water near the shore, I observed irregular masses of rough, porous

* These, I afterward learned, are not true sandpipers, but *Phalaropes*, and are, indeed, partially web-footed.

† I have, since (1875), observed the gathering of the larvæ, or rather pupæ, of these flies. About the 1st of July the pupæ are cast ashore in immense quantities. They are then gathered, dried, rubbed to break off the shell, and kept for use under the name of *Koo-chah-bee*.

limestone, evidently deposited from the water of the lake, or else from old limestone springs.

Soon after camping we went in swimming in the lake. The water is very buoyant, but the bathing is not pleasant. The shores are flat and muddy, and swarm with flies. These do not trouble one, but their appearance is repulsive. The water contains large quantities of carbonate of soda, a little carbonate of lime, and probably some borax. It therefore is very cleansing, but makes the skin feel slimy, and lathers the head and beard like soap. The presence of volcanic rocks and volcanic sand all around, and also of soda granite in the Sierras, sufficiently explains why this lake is alkaline instead of salt.

We bought here a little butter, cheese, and corned beef, and enjoyed them very much for supper. We have gotten out of the region of mutton. With the exception of patches of rich meadow, formed by the streams from the Sierra, everywhere is sage, sage, sage. The water, however, is delicious. The streams are formed by the melting snows of the Sierra, and these are so near by that the water is very abundant and ice-cold. Close by our camp there issues from a large, rough limestone rock a magnificent spring of ice-cold water, which runs off as a large brook.

Most of our party concluded to sleep here in a hay-loft. Hawkins and myself preferred a hay-cock. We put our blankets together, and had a deliciously soft, warm, and fragrant bed, under the starlit sky.

I desired very much to visit the islands from this point, but there was no boat. These islands, I understand, are the resort of millions of gulls, which deposit their eggs there in immense quantities. These eggs are an important article of food and of traffic for the Indians. Mono Lake is about fifteen miles long, and twelve miles across.

AUGUST 15.—Got up at 4:30 A. M., greatly refreshed by a fine night's rest. Got off about 7 A. M., in fine spirits. My horse is nearly well of his lameness this morning. Soon after leaving our camp this morning, we passed a rude Indian village, consisting of a few huts. The Indian huts in this region are nothing but a few poles, set up together in a conical form and covered with boughs. We bought from these Indians several quarts of pine-nuts.* They are about the size and nearly the shape of ground-pea kernels. We found them very sweet and nice. On leaving Mono, we struck out nearly northwest. We were therefore soon amongst the foothills of the Sierra again, and consequently in the mining regions. Saw many evidences of superficial mining. The débris of these washings by the whites are washed over by the Chinese. Passed quite a village of Chinese engaged in this way. The diminutive mud huts were strung along a little stream—Virginia Creek—in the bottom of a ravine, for a considerable distance. The whites call this Dog Town. I observed, even here, almost every hut had its little irrigated garden patch attached to it. I had an opportunity, also, of examining the process of hydraulic mining by the whites, and was much interested.

About 11 A. M. we met a fruit-wagon, loaded with fruit and other supplies, which had come over Sonora Pass, and was on its way to Mono. With a loud yell, the whole party made a simultaneous dash for the wagon, clambered up its sides, and swarmed over the boxes. Peaches, grapes, apples! Ah! how we enjoyed these delicious luxuries!

After making about twenty miles this morning, we camped for noon, about 12:30 P. M., at Big Meadows. This is a beautiful grassy plain, six or seven miles long and three or four miles wide, on which graze hundreds of cattle and horses. The view from this meadow is superb. Now, as I

* Nut of the *Pinus monophylla*.

sit here at our noon camp, I am surrounded on every side by mountains. Behind me, to the east, are the foothills we have just crossed; in front stretches the green meadow, and beyond rise the lofty Sierra.

The nearer mountains are immense, somewhat regular masses, smooth and green to the very summits, except where covered with patches of snow. Behind these, and seen through gaps, are the most magnificent group of singularly sharp and jagged peaks, tinged with blue by their distance, with great masses of snow in the deep hollows on their precipitous faces. The appearance of these great amphitheaters, with precipitous walls, suggested at once that these were the wombs from which once issued great glaciers. I wish my dear friends in Oakland could see us now; some eating, some washing up, some playing ball, some lolling about, and our saddles and packs grouped together where we unsaddled, our horses grazing quietly on the green meadow, and the whole surrounded by this really magnificent mountain scenery.

This afternoon we are wanting some supplies. Some of the party are sadly in want of shoes; some of the horses need shoeing. While three of the party, Captain, Pomroy, and Bolton, go to Bridgeport, a small town on Big Meadows,—distinctly visible from our camp, and but little out of our way,—the main body of the party went straight on, intending to choose camp and make fire before the rest came. Started about 4 P. M., intending to go only about seven miles and then camp in a cañon which we see emerging into Big Meadows, on the northwest—"Tamarack Cañon." As the sun went down behind the Sierra, the view became more and more splendid, and the coolness of the evening air increased our enjoyment of it. The delight of that evening ride, and the glory of that mountain view, I shall never forget.

About 6:30 found a place in the cañon where the grazing

was very fine and water abundant—the grass and clover fresh, tall, and juicy, and a little stream gurgling close by. Here we camped, turned our horses loose to graze, with lariats trailing, intending to stake them securely before going to bed. In the mean time it became very dark, and our companions not yet arrived. We made a rousing fire, and waited, hungry and impatient. They had the pack and the supplies. When at last they did arrive, which was about 9 P. M., they came shouting, and yelling, and hurrahing at the sight of the blazing fire. The noise stampeded our horses, and they ran affrighted and snorting up the steep sides of the cañon, over the mountains, and away into the impenetrable darkness of night. We could trace them only by their shrill snorting, and now and then by the flitting form of my old gray. After some fruitless attempts to recover them, which only increased their fright, the night being very dark, and the mountains very rough, we concluded to give it up until morning, and went to bed feeling much uneasiness.

We have been to-day on the first road we have seen since we left Clark's.

AUGUST 16.—At daybreak, two of the party, Hawkins and Linderman, went after the horses. By the time breakfast was ready they returned with them. They had tracked them over the mountains back to Big Meadows, where they found them quietly feasting, about three miles from camp. We started off about 8 A. M., and for eight or ten miles more traveled on the Sonora road, along the same narrow cañon in which we had camped. This cañon is not more than one hundred yards wide, flanked on each side by very steep hills and precipices, yet the bottom is quite level, and the road good. Passed immense masses of trap—ancient lava flows. In some places they are finely columnar. Mostly porphyritic lava and amygdaloid.

About ten miles from our camp, we reached Warm Springs. These are very fine and very large springs. A considerable brook runs directly from the principal spring. There are, moreover, several springs, having different properties. The waters seem to be violently boiling, but this is the result of escaping carbonic acid rather than steam. The temperature of the water seems to be about 150° to 160° . Everything suitable for a watering-place is found here; hot baths, vapor baths, accommodations for visitors, etc., although in somewhat rude style. We have here still another evidence of the decay of the mines in this region. This was once a flourishing watering-place, or at least expected to become so; but it is now entirely abandoned. Several parties are now stopping here to make use of the baths, and to hunt and fish in the vicinity. They bring, of course, their own provisions. Sage-hens are very abundant in the brush, and trout in the streams, in this region. I observe limestone now depositing from these carbonated springs. Also, near by, immense rough masses of the same, which have been similarly deposited at some previous epoch. The immense lava streams in this immediate vicinity, in fact all around, sufficiently account for the heat of these springs.

After examining the springs we rode on, leaving the Sonora road and taking a trail for Antelope Valley. Rain now coming on, we galloped on until we came to a good grazing meadow, about three miles from the Warm Springs. There was here a rude pole house — probably a shepherd's lodge — which sufficiently protected us and our provisions from the rain. Here, therefore, we camped for noon. While here, a party of ladies and gentlemen rode by and camped a little beyond. They had a wagon for protection. The ladies seemed to be true Amazons — managed their horses with the utmost ease, dashed about in the most fearless manner, saddled and unsaddled, mounted and dis-

mounted, without assistance. They were, in short, true cavaliers in petticoats.

This afternoon, the rain detained us here a little longer than we had intended. Started about 3:30 P. M. Delightful ride in the cool of the evening. All in high spirits. We reached a ridge overlooking Antelope Valley about sunset. Before us Antelope Valley lay spread out at our feet (but ah! how far below us we found to our cost that night), behind us the magnificent Sierra, and the sun setting behind it. We stopped and gazed first at one and then at the other.

"Antelope Valley is but a step; what is the use of hurrying?" "Nevertheless, we had better go on. Remember Laddsville and Chowchilla Mountain." On we rode. Presently a cañon, right across the way—and such a cañon! "Surely it is impossible to cross that!" A thousand feet deep, and less than a thousand feet wide at the top, and the sides seemingly perpendicular! But across it we must go. Already we see Hawkins and the advanced guard near the top on the other side. We speak to them across the yawning chasm. The trail wound backward and forward, down one side, across the foaming stream, and then backward and forward up the other side. We followed the trail, though it led us on the dizzy edge of fearful precipices. We have become accustomed to this sort of thing, and so have our horses.

Onward we pushed; next across an inextricable tangle of sagebrush and trap boulders; then down another cañon, and across another ridge; then down, down, down; then over another ridge, and darkness overtook us. Then down, down, down. We lost the trail; scattered about to find it. "Here it is!" found again; lost again; scatter; found again, and so on; but always still down, down, down. At last we reached the plain, after descending at least four thousand feet. In the valley at last! But alas! no meadow; nothing but sage, sage, sage. Very dark; neither moon nor stars.

Onward we push, guided only by lights we see in the valley. "Hello! where are you?" we hear from behind. "Here! come on!" we answered. We stop a while until laggards come up. Onward again we urge our tired horses, winding through the sagebrush. Onward, still onward, straining our eyes to peer through the thick darkness. Onward, still onward, five long miles, through the interminable sage desert, without trail, and guided only by the lights. One by one the lights disappear. "What shall we do?" "Can't stop here. Push on." At last reached some Indian huts. "How far to white man's house?" "Leetle ways." "How many miles?" "No savé." "One mile? two mile? half mile?" "No savé." Onward, still onward. In despair we stopped to consult. At the Indian huts we had struck a road, but it was leading us away from the direction in which we had seen the lights. We again struck into the pathless sage. Hawkins is reconnoitering, a little in advance. "Here we are!" we heard him cry. "Whoop! A barley-field!" It was without a fence. We determined to ride in, unsaddle, make our camp, allow our horses to eat their fill of standing barley, and make it good by paying in the morning. It was 10 P. M. Some of the party were so tired and sleepy that they preferred to go to bed supperless, and therefore immediately threw themselves on the ground and went to sleep. Five of us, however, determined to build a fire and cook supper. Ah! what a glorious fire sagebrush makes! Ah! what a splendid supper we cooked that night! Ah! how we laughed in our sleeves at the mistake that the sleepers had made! Comforted and happy, and gazing complacently yet compassionately on the prostrate forms of our companions, moaning in their sleep with the pangs of hunger, we went to bed at 11:30 P. M., and slept sweetly the sleep of innocence. If we are trespassing, it is time enough to think of that in the morning.

We have ridden twenty-eight to thirty miles to-day, and about the same yesterday. To-day the trail has been very rough. Our horses are quite tired.

AUGUST 17.—Woke up much refreshed by a sound, dreamless sleep. This valley can't be more than three to four thousand feet high. Last night was the warmest we have felt since we left Yosemite. I had just waked up. I was sitting on my blankets, putting on my shoes, and thinking repentantly of our trespass. The sun was just rising. Yonder comes swift retribution in the shape of a tall, rough-looking mountaineer, with rifle on shoulder and pistol in belt, galloping straight towards us. As he comes nearer, he looks pale, and his lips are firmly compressed. He stops before me suddenly. "You seem to have had a good thing here last night?" "Why, yes, rather—but we intend, of course, to pay for it." "I am glad to hear it." He was evidently greatly provoked by our trespass, but after we had explained the circumstances, and had paid him four dollars, he seemed very well satisfied, bade us good-morning, put spurs to his horse, and rode off as rapidly as he had come.

We did not get off so early as usual this morning. The supperless ones slept heavily this morning and got up growling. Hawkins was up and out shooting by daybreak, and returned with a fine rabbit, which, with other camp delicacies, put all in good humor at breakfast.

Started about 8 o'clock. This valley being so deep, of course we had to climb very high to get out of it. The road is, however, tolerably good. We nooned about ten miles from Antelope Valley, at Silver King, a deserted mining town. This is a good example of many similar towns in the mining districts of California. They are rapidly built up—property rising to a fabulous price—then as rapidly decay. This one seems to have flashed up and

gone out more suddenly than usual. There are several rather pretentious but unfinished buildings—hotels, stores, etc. The lots are all staked out, and a few years ago were held at high prices. Evidences of mining operations close by. I examined these, but saw no evidence of any special value. We took possession of the otel; used the bar-room as our dining-room, and the bar-counter as our table. Made a hearty dinner; the young men all the while playing hotel life, laughing and calling "Waitaw! roast beef! Waitaw! bottle of champagne!" etc.

3 P. M.—Rode rapidly this evening, a good part of the way at an easy lope, and camped at a meadow in Bagsley's Valley, about two miles from Monitor. Here we found, to our great delight, a flock of sheep. We bought one and enjoyed mutton chops for supper again. After supper we all gathered around the camp-fire, and I gave the party a talk on the subjects of Bloody Cañon and its glacier, the volcanoes of Mono, and the lava flows and warm carbonated springs we saw yesterday; but as the substance of what I then said is scattered about among these notes, I omit it here.

It being quite cool to-night, Hawkins and myself concluded to bunk together.

AUGUST 18.—Last night was the coldest we have yet felt. Could not sleep very well for the cold. This morning, when I woke up, my blanket, hair, and beard were covered with a heavy frost. The meadow was white with the same. The water left over night in our tin canister was frozen. A blazing fire, and plenty of mutton chops, bread, and hot tea, soon thawed us, and by the time the sun was up an hour or so, it was quite warm again. One of the shoes put on my horse by Mr. Hawkins, at Alliton's, being very thin at the point, has broken, and half of it come off. I found, on leaving camp this morning, that my horse was

painfully lame again. The sharp fragments of rock which cover the road here make him shrink and limp and groan at every step. Fortunately the town of Monitor is only two miles off. I determined here to get him well shod all around. I stopped at Monitor for this purpose, while the rest of the party rode on to Markleeville, about eight miles farther, where they would stop, in order to get supplies for the party. While he was shoeing my horse, I sat and talked much with the blacksmith. I delight in seeing any work well done. He was master of his trade. I also delight in seeing a fine physique. He was a well-made, strong, and really handsome man. He was also a man of few words and much good sense. I would like to meet that man again; I often think of him. I wonder if he has thought a second time of *me*? Probably not.

After shoeing, I hurried on and overtook the party at Markleeville. Here it was inconvenient to cook our own meal, so we all took dinner at the hotel. The dinner was really excellent, and we all enjoyed it greatly. Think of it! Besides the meats, which we could have had as good in camp, rice, in genuine Southern style (my heart warmed toward mine host), potatoes, beans, corn, pies, cakes, and sweetmeats. The variety tempted too much.

I received more letters from home at this place. Every one at home has been perfectly well since I left. I am light-hearted to-day. I shall be at home in a week or ten days. I wrote to that effect.

All along the road from Monitor to Markleeville, and in Markleeville itself, I have seen sad evidences of the effects of the speculative spirit—sad evidences of time and money and energies wasted. Deserted houses and deserted mines in every direction. The Indians, of whom there are a large number about Markleeville, occupy these deserted houses. Some of the mines which I saw seemed to have been undertaken on an expensive scale. They are mostly quartz-mines.

By invitation of Mr. Hawkins, we went on this afternoon only three miles, and camped at a ranch belonging to his brother. Beautiful ranch, nice meadows for our horses, rich butter and milk for ourselves, baths, hot, cold, and warm, issuing from fine springs. The place has been rudely fitted up for bathing.

This is indeed a most delightful place, and the party seem to feel its effects upon their spirits. While the horses graze, and I sit in the shade and write this, the young men are playing ball on the smooth-shaven green. The meadow is surrounded by high, almost perpendicular, and apparently impassable mountains on every side except that by which we came. In such a secluded, beautiful dell, deep sunk in the mountain-top, might a Rasselas dream away his early life. Over those apparently impassable cliffs must we climb to-morrow, if we would go on to Tahoe. Hawkins had intended leaving us here, as he lives in this vicinity, but he has kindly volunteered to lead us over the mountains into Hope Valley, from which the road onwards to Tahoe is very good.

I took here a hot bath, so hot I could hardly bear it, and immediately after an ice-cold shower. The effect was delightful. Most of the party slept here in a hay-loft. I preferred sleeping with Hawkins, in the open air, on a hay-stack.

AUGUST 19.—Heavy frost again this morning. Water and milk left from supper last night frozen. Took again, early this morning, the hot bath and cold shower. Mr. Hawkins observed yesterday for the first time that his horse is badly foundered. He takes another horse here, and by preference a powerful young horse, upon which man never sat before. Think of going over the most terrible mountain trail on such a horse! But he is accounted, I find, the best rider and horse-tamer in the county. He

mounted his horse just before we were ready to start, and in half an hour he had tamed him completely.

The trail from this place into Hope Valley is one of the steepest we have yet attempted. It is a zigzag, up an almost perpendicular cliff. In many places there can be no doubt that a false step would have been certainly fatal to man and horse. In the steepest parts we dismounted and led the horses a great portion of the way up. In many places there was no detectable trail at all. When once up, however, the trail was very good. From the top of this ridge I saw many fine peaks of columnar basalt, evidently the remnants of old lava streams. The descent into Hope Valley is much more gentle. This valley is a famous resort for fishing and hunting parties. As we entered the valley and were about to stop for noon, we met one of these—a large party of ladies and gentlemen. Of course, we straightened up, and dashed by in fine style, and immediately dismounted and camped on a grassy meadow on the banks of the creek. They seemed much amused and somewhat astonished at our wild appearance.

2 P. M.—After resting here two hours, we started on our way to Tahoe. Here Hawkins left us. Every one of the party was sincerely affected. He has been the soul of our party. I don't believe we could have gotten along without him. So generous, so efficient, so thoroughly acquainted with camp and mountain life. He scents out a trail with the instinct of a bloodhound. As he turned, we all waved our hats and cried, "Three cheers for our noble Lieutenant! Hurrah! hurrah!! hurrah!!!" His face flushed and eyes filled. I know he was gratified with the heartiness of the salute.

We now proceeded by a good wagon-road, and therefore quite rapidly. About 5 P. M. rode in double file up to Yank's and reined up.* The fat, bluff old fellow cries out,

*Yank, some years after this, moved his hotel to the border of the lake.

"Hello! where are you fellows from? Where are you going?" "Excursion party to Tahoe; where best to stop?" "You want to have a free, jolly time, don't you?" "O, yes, certainly." "Well! you camp at this end of the lake, near Rowland's." On we went, at a good round pace, and camped at 7 P. M. in a fine grove of tamaracks, on the very borders of the lake.

We have, I observed this evening, passed through the region of slate (mining region) and the region of lava flows, and are again in the region of granite. The granite about Tahoe, however, is finer-grained than that about Yosemite and Tuolumne Meadows, especially the latter.

AUGUST 20.—I am cook to-day. I therefore got up at daybreak and prepared breakfast while the rest enjoyed their morning snooze. After breakfast we hired a sail-boat, partly to fish, but mainly to enjoy a sail on this beautiful lake.

Oh! the exquisite beauty of this lake—its clear waters, emerald-green, and the deepest ultramarine blue; its pure shores, rocky or cleanest gravel, so clean that the chafing of the waves does not stain in the least the bright clearness of the waters; the high granite mountains, with serried peaks, which stand close around its very shore to guard its crystal purity;— this lake, not *among*, but *on*, the mountains, lifted six thousand feet towards the deep-blue overarching sky, whose image it reflects! We tried to fish for trout, but partly because the speed of the sail-boat could not be controlled, and partly because we enjoyed the scene far more than the fishing, we were unsuccessful, and soon gave it up. We sailed some six or eight miles, and landed in a beautiful cove on the Nevada side. Shall we go in swimming? Newspapers in San Francisco say there is something peculiar in the waters of this high mountain lake. It is so light, they say, that logs of timber sink immediately, and bodies of

drowned animals never rise; that it is impossible to swim in it; that, essaying to do so, many good swimmers have been drowned. These facts are well attested by newspaper scientists, and therefore not doubted by newspaper readers. Since leaving Oakland, I have been often asked by the young men the scientific explanation of so singular a fact. I have uniformly answered, "We will try scientific experiments when we arrive there." That time had come. "Now then, boys," I cried, "for the scientific experiment I promised you!" I immediately plunged in head foremost and struck out boldly. I then threw myself on my back, and lay on the surface with my limbs extended and motionless for ten minutes, breathing quietly the while. All the good swimmers quickly followed. It is as easy to swim and float in this as in any other water. Lightness from diminished atmospheric pressure! Nonsense! In an almost incompressible liquid like water, the diminished density produced by diminished pressure would be more than counterbalanced by increased density produced by cold.

After our swim, we again launched the boat, and sailed out into the very middle of the lake. The wind had become very high, and the waves quite formidable. We shipped wave after wave, so that those of us who were sitting in the bows got drenched. It was very exciting. The wind became still higher; several of the party got very sick, and two of them *cascaded*. I was not in the least affected, but, on the contrary, enjoyed the sail very much. About 2 P. M. we concluded it was time to return, and therefore tacked about for camp.

The wind was now dead ahead, and blowing very hard. The boat was a very bad sailer, and so perhaps were *we*. We beat up against the wind a long time, and made but little headway. Finally, having concluded we would save time and patience by doing so, we ran ashore on the beach about a mile from camp and towed the boat home. The

owner of the boat told us that *he* would not have risked the boat or his life in the middle of the lake on such a day. "Where ignorance is bliss," etc.

After a hearty supper we gathered around the fire, and the young men sang in chorus until bedtime. "Now then, boys," cried I, "for a huge camp-fire, for it will be cold to-night!" We all scattered in the woods, and every man returned with a log, and soon the leaping blaze seemed to overtop the pines. We all lay around, with our feet to the fire, and soon sank into deep sleep.

AUGUST 21 — SUNDAY. — Sunday at Tahoe! I wish I could spend it in perfect quiet. But my underclothes must be changed. Cleanliness is a Sunday duty. Some washing is necessary. Some of the party went fishing to-day. The rest of us remained in camp and mended or washed clothes.

At 12 M. I went out alone, and sat on the shore of the lake, with the waves breaking at my feet. How brightly emerald-green the waters near the shore, and how deeply and purely blue in the distance! The line of demarcation is very distinct, showing that the bottom drops off suddenly. How distinct the mountains and cliffs all around the lake; only lightly tinged with blue on the farther side, though more than twenty miles distant!

How greatly is one's sense of beauty affected by associations! Lake Mono is surrounded by much grander and more varied mountain scenery than this; its waters are also very clear, and it has the advantage of several picturesque islands; but the dead volcanoes, the wastes of volcanic sand and ashes covered only by interminable sagebrush, the bitter, alkaline, dead, slimy waters, in which nothing but worms live; the insects and flies which swarm on its surface, and which are thrown upon its shore in such quantities as to infect the air,—all these produce a sense of desolation

and death which is painful; it destroys entirely the beauty of the lake itself; it unconsciously mingles with and alloys the pure enjoyment of the incomparable mountain scenery in its vicinity. On the contrary, the deep-blue, pure waters of Lake Tahoe, rivaling in purity and blueness the sky itself; its clear, bright emerald shore waters, breaking snow-white on its clean rock and gravel shores; the lake basin, not on a plain, with mountain scenery in the distance, but counter-sunk in the mountain's top itself,—these produce a never-ceasing and ever-increasing sense of joy, which naturally grows into love. There would seem to be no beauty except as associated with human life and connected with a sense of fitness for human happiness. Natural beauty is but the type of spiritual beauty.

Enjoyed a very refreshing swim in the lake this afternoon. The water is much less cold than that of Lake Tenaya or the Tuolumne River, or even the Nevada River.

The party which went out fishing returned with a very large trout. It was delicious.

I observe on the lake ducks, gulls, terns, etc., and about it many sandhill cranes—the white species. The clanging cry of these sounds pleasant to me by early association.

AUGUST 22.—Nothing to do to-day. Would be glad to sail on the lake or fish, but too expensive hiring boats. Our funds are nearly exhausted. Would be glad to start for home, but one of our party—Pomroy—has gone to Carson City, and we must wait for him.

I went down alone to the lake, sat down on the shore and enjoyed the scene. Nothing to do, my thoughts to-day naturally went to the dear ones at home. Oh! how I wish they could be here and enjoy with me this lovely lake! I could dream away my life here with those I love. How delicious a dream! Of all the places I have yet seen, this

is the one which I could longest enjoy and love the most. Reclining thus in the shade, on the clean white sand, the waves rippling at my feet, with thoughts of Lake Tahoe and of my loved ones mingling in my mind, I fell into a delicious doze. After my doze I returned to camp, to dinner.

About 5 P. M. took another and last swim in the lake.

Pomroy, who went to Carson, returned 7 P. M. After supper, again singing in chorus, and then the glorious camp-fire.

AUGUST 23.—We all got up very early this morning. We wish to make an early start. All in high spirits; for we start for home to-day. I wonder if any one is half so anxious and impatient as I am. We wish to make Sacramento in three days. The distance is 110 miles or more. We must start early and ride late, if necessary. After camping three days in the same place, however, there is always much to collect and to fix. In spite of our early rising, we did not get off until about 7 A. M. Our route lay over Johnson's Pass and by Placerville. We rode rapidly, however, alternately walking and galloping, and made twenty miles by 12 o'clock. About ten miles from Tahoe we reached the summit. We turned about here, and took our last look at the glorious lake, set like a gem in the mountains. From the summit we rode rapidly down the splendid cañon of the south fork of the American River, here but a small brook, and stopped for noon about two miles below Strawberry, on a little grassy patch on the hill-side, "close by a softly murmuring stream." Here we staked our horses, cooked and ate dinner, and "loll'd and dream'd" for three hours, and then again saddled up and away.

Every pleasure has its pain, and every rose its thorn. We are in the region of good roads again,—but oh! the dust! It is awful! About 4 P. M. saw a wagon coming;

our instincts told us that it was a fruit-wagon. With a yell, we rushed furiously upon the bewildered old wagoner. "I surrender! I surrender!" he cried, while, with a broad grin, he handed out fruit and filled our extended hats. "A-a-ah! Peaches! grapes! apples!" How delicious on this hot, dusty road! Rode this evening eleven or twelve miles, the cañon becoming finer as we advanced, until, at Sugarloaf Gorge, it reaches almost Yosemite grandeur. Camped at 6 P. M. near an inn called "Sugarloaf," on account of a remarkable rock, several hundred feet high, close by. Our camp-fire was not far from the inn. At a window we saw two young ladies giggling and making merry at our cook—Mr. Linderman—mixing dough and baking bread. We sent them a piece, just to show them what we could do. No good ground to sleep on here. We don't relish sleeping in the dusty road. We therefore took our blankets and slept in the hay-loft. Although we left the window open, we found it rather close. Alas! alas! no more grand forests, no more grassy meadows, no more huge, leaping camp-fires; only dusty roads, dirty villages, and stable lofts and stalls.

I have been observing the cañon down which we came to-day. Johnson's Pass, like Mono Pass, was a glacial divide. One glacier went down on the Tahoe side, a tributary to the Tahoe Glacier, but a much larger glacier came down the American Cañon. Sugarloaf Rock has been enveloped and smoothed by it. This great glacier may be traced for twenty-five miles.

AUGUST 24.—As we get into the region of civilization again, incidents are less numerous. I observed, both yesterday and to-day, very many deserted houses. This was the overland stage-road. Two years ago the amount of travel here was immense. I think I heard that there were twelve to fifteen stages a day. Now the travel is small, the railroad, of course, taking the travelers. The

road is, however, splendidly graded, but the toll is heavy. This morning the road ran all the way along the American River, sometimes near the water's edge, but mostly high up the sides of the great precipitous cañon formed by the erosive power of the river. The scenery all the way yesterday and to-day is fine, but especially along the American River it is really very fine. If we had not already drank so deep of mountain glory, we would call it magnificent. Again, this morning, walking and galloping alternately, we made easily twenty miles by 12 o'clock. Stopped for noon at "Sportsman's Hall," a roadside inn. Here, after dinner, we sold "Old Pack" for twenty dollars, exactly what we gave for him, left our cooking utensils (our supplies were just exhausted), and determined hereafter to take our meals at the inns on the roadsides or in the villages. Disencumbered of our pack we could ride more rapidly.

This afternoon we rode sixteen miles; thirteen to Placerville, then through Placerville and three miles beyond, to Diamond Springs. On approaching Placerville, I observed magnificent orchards, cultivated by irrigation. I never saw finer fruit. Saw everywhere about, and in Placerville, abundant evidences of placer mining. The streams are also extensively used for this purpose, and are therefore all of them very muddy. Placerville is by far the largest and most thriving village I have seen since leaving Oakland. It probably contains two or three thousand inhabitants. The houses are stuck about along the streams and on the hill-sides in the most disorderly manner, their position being determined neither by regularity nor beauty nor picturesque effect, but chiefly by convenience in mining operations. The streets are very few, very long, very irregular, very narrow. Nevertheless, the general effect is somewhat picturesque. As we rode into town, and passed in double file through the streets, Captain at the head, erect, and evidently feeling his dignity, the young men descried a

billiard-saloon, became suddenly demoralized, broke ranks, incontinently dismounted, frantically rushed in, and immediately the click of the billiard-balls was heard. Greatly disgusted at such insubordination, the Captain rode on with me to the post-office. Here I mailed a letter to my wife, saying I would be at home probably on the night of the 26th. Onward then through the town for nearly a mile (it stretches so far along the stream), then up the hill, turned on the top and took a look at the town, pleasantly nestled below, among the hills; then over the toll-bridge and onwards until, about dark, we reached the little village of Diamond Springs, and put up our horses at Siesbuttel's inn. Here we got as good a supper as any one could desire,—and such coffee!

That night, to any attentive listener there must have been much good music in the stable — nine horses, crunching, crunching, below, and nine sleepers, snoring, snoring, above.

I was surprised to learn from our host that Placerville and vicinity is very sickly. Everybody suffering from chills and fevers. He himself is suffering from this disease. Cause seems to be the stirring up of the earth by mining, and especially the damming up of waters for irrigation.

AUGUST 25.—Early start this morning. Got fairly off by 6 A. M. Rode rapidly, and made twenty-one miles by 11:30 A. M. Stopped for noon at the Half-way House. Took a swim — our very last — in a pond near by, and our dinner at the inn. Slept an hour, lying on the floor of the piazza; rested our horses until 3 P. M., and then again onward for home.

In the afternoon we rode fourteen miles, to Patterson's Ten-mile House. We found this a delightful place. Mr. Patterson is really a very pleasant and courteous gentleman, and gave us a most excellent supper. This put us all in

excellent humor. The young men got lively. One of them, Mr. Perkins, played on the piano, while the rest joined in a stag-dance. The clattering of heavy boots on the bare floor was not very harmonious, it is true, but then it was very enlivening. The host and all the guests in the house seemed to enjoy it hugely.

Two nights past we have been compelled to sleep in the stable loft, or else in the dusty streets. We are more fortunate to-night. There is a magnificent straw-bank in the open field on the other side of the road. "Once more under the starry canopy! Now for a good sleep! Our Father up there in the starry heavens, watch over us. Amen!"

We are again on the plains of Sacramento, but we no longer find the heat oppressive. We have been all along the road mistaken for horse or cattle drovers, or for emigrants just across the plains. We were often greeted with, "Where's your drove?" or "How long across the plains?" We have been in camp nearly six weeks, and ridden five or six hundred miles. Burned skin, dusty hair and clothes, flannel shirt, breeches torn, and coarse, heavy boots; the mistake is quite natural.

AUGUST 26.—"Home to-day! Hurrah! Wake up, all!" After an early breakfast, got off 6:30 A. M. We rode into Sacramento, 10 miles, in 1½ hours, galloping nearly the whole way. We went at a good gallop in the regular order—double file—through the streets of Sacramento, the whole length of the city, down to the wharf, and there tied our horses. Everybody crowded around, especially the little boys about the wharf, curious to know "who and what were these in strange attire."

Having nothing to do until 12 M., when the boat leaves, Captain and myself strolled through town. The Captain, with flannel shirt, bare neck, shocking bad hat, stout bro-

gans, long knife stuck in belt, and a certain erect, devil-may-care air, certainly looked like a somewhat dangerous character. As we sauntered along the streets, a little sharp-looking Jew suddenly rushed out from his store, crying: "Now, gentlemen, I know you are in want of clothes. Here we are,—the cheapest and finest in town. This way, gentlemen; this way!" "No; we don't want any clothes; we have plenty at home." "Are n't you the party who went galloping down the street just now?" "Yes." "Where are you from?" "Only a pleasure party." "Why, I thought you were outlaws, or cattle-drovers, or horse-dealers, or emigrants over the plains, or something of that kind."

We then visited the State House. As we walked along the corridors towards the well-dressed and courteous usher, the Captain looked very grand. The usher seemed instinctively to know that we were not exactly what we seemed. He treated us very courteously, and showed us the fine halls of Representatives and Senate. We read, "Cum ore rotundo," the Latin inscriptions, and translated, to the great astonishment of the usher. We now went back to the wharf, and cut and ate cantaloupes; then to a restaurant, and had a most delicious dinner, of which we partook very heartily; then on board of the boat for San Francisco, and tied our horses all in a row and gave them hay, then up into the cabin.

Everybody looked at us with interest and surprise. "Who are they?" Gradually it became known who we were, and we were treated with courtesy, and even became lions. Captain of the boat took some of us up to his room, and asked many questions. Dinner at 4 P. M. I went down, and again ate one of the heartiest dinners I ever ate in my life. I cannot get enough to-day. Our rough appearance gave rise to some amusing incidents. I was coming up-stairs, from deck to cabin. Superbly dressed mulatto at the landing. "Got a cabin check, sir?" show-

ing me one. "No; I have not." "Can't come up." "But I paid cabin fare." "Can't come up." Here a white official, who knew me, interfered and apologized.

San Francisco at last! We all went in a body ashore. The cabmen thought here was a prize of greenhorn mountaineers. They came round us in swarms. "Lick House?" "American Exchange?" "Cosmopolitan?" "Who wants a hack?" was screamed into our ears. The young men screamed back, "What Cheer House! Russ House! Occidental! This way, gentlemen!" etc. They soon saw that they had better let us alone. We mounted, and dashed off to the Oakland wharf. Not open yet; what shall we do? we will ride about town. Pomroy and myself rode to the Lick House, where he wished to get a bundle, which he had left in Cobb's room. He dismounted at the ladies' entrance, and I sat on horseback and held his horse. As he opened the door the porter said, "What do you want?" "Never mind," and he ran up-stairs. Porter came out and said to me, "What does that man want?" "Mr. Cobb," said I. Door shuts. Presently out he comes again. "Who is that man?" I gave him no answer. Again: "Where did that man come from?" I took no notice of him. Door shuts again, and I could see through the glass that he went up-stairs to look after *that man*. After a little, Pomroy came and told me that the porter had finally recognized him, and apologized.

Our glorious party is, alas, dissolving. Three—Cobb, Bolton, and Linderman—left us here; the rest of us now rode down again to the wharf, and found the gate open. Went in and tied our horses. Went across the way and again took a cup of coffee, and ate heartily of doughnuts. Back to the waiting-room and dozed. At 11:30 got on board the boat for Oakland. Landed at the pier, we galloped alongside the swift-moving cars, the young men hurrahing. The race was kept up pretty evenly for a little

while, but soon the old steam horse left us behind, and screamed back at us a note of defiance. We went on, however, at a sweeping gallop, through the streets of Oakland, saluted only by barking dogs; dismounted at the stable, bid each other good-night, and then to our several homes; and our party, our joyous, glorious party, is no more. Alas, how transitory is all earthly joy! Our party is but a type of all earthly life; its elements gathered and organized for a brief space, full of enjoyment and adventure, but swiftly hastening to be again dissolved, and returned to the common fund from which it was drawn. But its memory still lives; its spirit is immortal.

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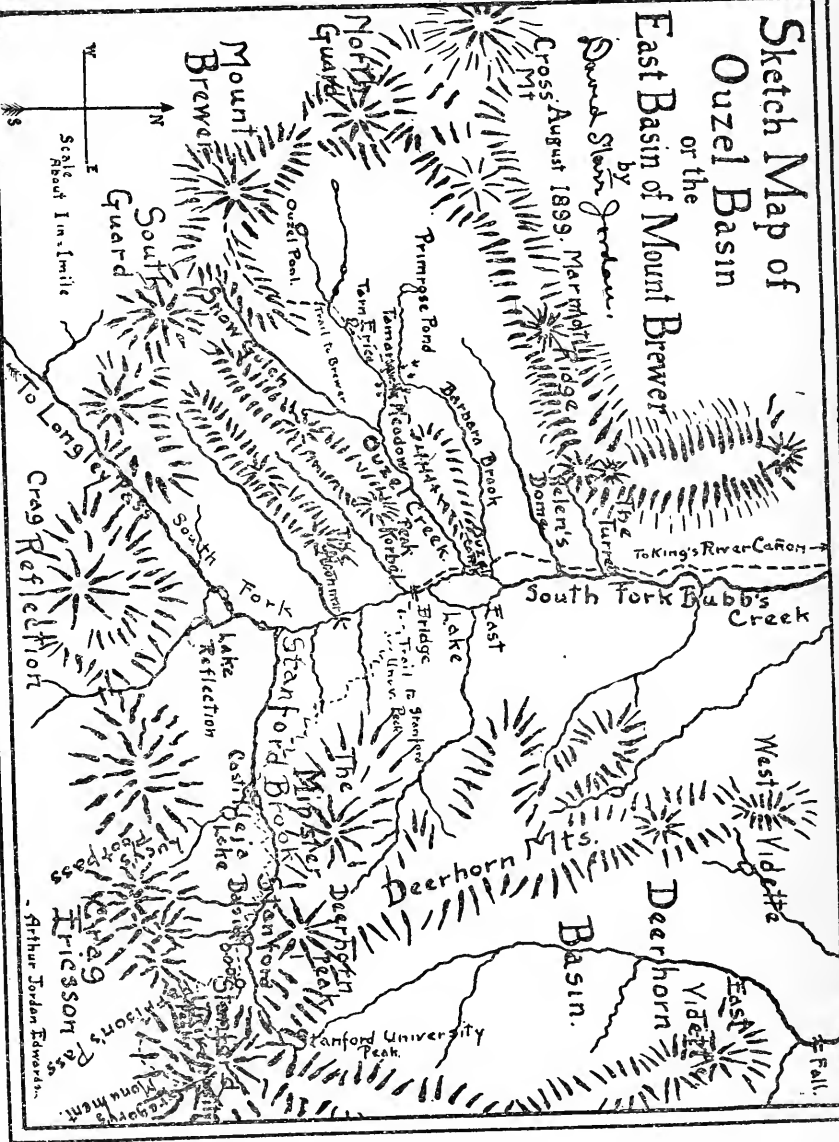
The purposes of the Club are:—"To explore, enjoy and render accessible the mountain regions of the Pacific Coast; to publish authentic information concerning them; to enlist the support and co-operation of the people and the Government in preserving the forests and other natural features of the Sierra Nevada Mountains."

Sketch Map of Ouzel Basin

or the
East Basin of Mount Brewer

by
David Sloan Jordan.

Cross August 1899. Marmot Ridge



- Arthur Jordan Edmester.

NOTES AND CORRESPONDENCE.

THE EAST BASIN OF MOUNT BREWER,
OR OUZEL BASIN.

Of the many granite-rimmed, glacier-polished basins of the High Sierra, there is none more majestic in its surroundings or more beautiful in its outlook than the basin to the east of Mount Brewer, for which I here suggest the name of "Ouzel Basin." As this is visited each year by an increasing number of mountain-lovers, it seems well to give special names to the minor objects included in it. I here present a sketch map of the basin, with the tributary basin to the east, bounded by Stanford* University Peak and Harrison's Pass, on which are proposed new names for a number of objects. On this map no attempt has been made to measure distances. Directions were taken without compass, but these have been corrected, so as to correspond with a map of the King-Kern Divide recently published by Mr. J. N. Le Conte.

The following are the new names suggested:—

Crag Reflection, for the crag above Lake Reflection.

Lucy's Footpass, for the pass to the west of Crag Ericsson, traversed by Professor and Mrs. Bolton Coit Brown, and noted on Brown's sketch map as "Footpass." It is named for Mrs. Lucy Fletcher Brown.

Ouzel Creek, for the brook which flows from Mount Brewer into East Lake. The water-ouzel abounds here, and it is said that John Muir's account of the water-ouzel, one of the finest bird biographies ever written, was based largely on observations made on this stream.

Snow Gulch, for the snow-filled southern branch of Ouzel Creek.

*Professor Bolton Coit Brown first climbed this fine peak, giving it the name of Mount Stanford. As the latter name has been applied to a peak near the Placer County summit, it may be held to be ineligible in this case. In such event, Professor Brown suggests the substitution of the name "Stanford University Peak," the similar peak to the northeast in the main Divide being the "University of California Peak." The Stanford Peak has two crests. The northernmost, a little the higher and accessible with great difficulty, is the one to which the name Stanford was especially applied by Professor Brown. The other was named by him "Gregory's Monument," from Mr. Warren Gregory, who first climbed it. This magnificent view-point is easily reached from Harrison's Pass.

Ouzel Pool, at the base of Mount Brewer, the source of Ouzel Creek.

Peak Korbel, for the ridge and peak next south of Ouzel Creek. This was climbed by Mr. Joseph Jarnick, a student of Stanford University, who suggested the above name in honor of a friend.

Noon Mark, the peak next south of Korbel, lying directly south of *Ouzel Camp*, the camping-ground on the north side of Ouzel Creek, at the base of the glaciated rocks.

Stanford Brook, the stream flowing in at the head of East Lake, rising in the boulder-covered

Stanford Basin, at the foot of Stanford University Peak, Gregory's Monument, and Harrison's Pass. Stanford Brook receives the outlets of Castilleja Lake and Lake Reflection, and rises in five little lakes in Stanford Basin.

The Minster, a Gothic crag lying to the north of Stanford Brook and adjoining Deerhorn Mountain.

Tarn Erica, a beautiful deep-green pool lying in a joint or cleft in the rock on the way to Mount Brewer, tributary to Ouzel Creek.

Barbara Brook, the smaller stream in the Ouzel Basin, lying to the north of Ouzel Creek.

Prinrose Pond, a small lake tributary to Barbara Brook.

Tamarack Meadow, a small meadow covered with grass and heather, with many tamarack-pines, traversed by both Ouzel Creek and Barbara Brook, the two streams running very near together.

Marmot Ridge, the long ridge bounding the basin on the north and northwest. At the base of this ridge the mountain marmots or woodchucks abound.

Helen's Dome, the rounded dome at the east end of Marmot Ridge. It is named for Mrs. Helen Vanuxem Cubberly, a member of our party.

The Turret, a sharp point at the side of the Dome.

Ouzel Basin. As the name Brewer Creek has been taken for the stream which flows to the westward from Brewer Lake on the west side of Mount Brewer into Roaring River, the name *Brewer Basin* should be applied to the glacial valley through which this stream runs. The basin to the east and north of Mount Brewer, drained by Ouzel Creek and Barbara Brook, which, with Stanford Brook, furnish most of the water of the South Fork of Bubb's Creek, may receive the name of *Ouzel*

Basin, of which term East Basin of Mount Brewer may be regarded as a descriptive synonym.

I am under obligations to Mr. Arthur Jordan Edwards for the preparation of this map for publication, and to Professor Vernon L. Kellogg, the leader of the party of which the writer was a member, for various suggestions in regard to it.

PALO ALTO, Nov. 13, 1899.

DAVID STARR JORDAN.

FORESTRY NOTES.

EDITED BY PROFESSOR WILLIAM R. DUDLEY.

NEW FOREST RESERVES. The forest reserves have been enlarged by the extension, on October 21st, of the *Prescott* (Arizona) *Forest Reserve* from 10,240 acres to about 423,680 acres, and by the creation of the *Santa Yñez Forest Reserve*, of 145,000 acres, lying along the crest of the Santa Yñez Mountains, in southern Santa Barbara County, California. The latter reserve was proclaimed by President McKinley, October 2, 1899, and is complementary to the Pine Mountain and Zaca Lake Forest Reserve.

PUBLIC LANDS. A remarkable amount of space in the newspapers of this State has recently been given to the discussion of the related problems of forestry, irrigation, and the leasing of the grazing lands; but few people, nevertheless, have a clear idea of the relative amounts of public and private land in California. The figures given below are taken from the statistics of the United States Government, 1898, and, so far as the forest reservations are concerned, are corrected to date, to include the Santa Yñez Forest Reserve :—

Total amount of land appropriated (private).....40,668,890 acres
Total amount of land unappropriated (U. S. G.)...58,692,193 “

99,361,083 acres

Amount in the National Parks of California..... 1,130,240 acres
Amount in the U. S. Forest Reserves of California.. 8,853,129 “
Total amount in U. S. G. Reservations in California. 16,500,000+ “
Amount of Grazing Lands (outside of Reservations). 22,500,000+ “
Amount of Desert Lands.....19,000,000+ “

THE FOREST RANGER SYSTEM. To the student of American forestry problems, nothing is of greater importance, just now, than the course of legislation. Next to that comes the practical work in connection with forest protection and the public sentiment regarding it. The friends of forestry in Southern California have scrutinized very closely the work of the forest rangers, and report great improvement this season, and are satisfied that the work is being faithfully done. Many members of the Sierra Club have this year been through portions of the reserves in the Sierra, and the general impression has been favorable, so far

as I have heard. Considerable publicity has been given to the work of forest patrol in the reserves; and the supervisors and their rangers are not only aware of this, but appear now to be of the class who welcome the support which the friends of forestry are likely to give them, as well as the interest they take in the rangers' important duties relating to forest fires. Commissioner Hermann, in a very instructive article in *The Forester* for 1899 (p. 195), declares it the practice of the United States Land Office to apply civil-service tests in the selection of all working officials in the ranger system. The following facts are taken from his article, and show that California has a much larger acreage in forest reservations than any other State, and also proportionally a much larger number of forest rangers to patrol them. There are now thirty-six forest reserves, confined to eleven States and Territories, having an aggregate of over 46,000,000 acres. These reserves are divided into nine districts, each with a superintendent. Each district is divided into supervisors' districts, in charge of a supervisor. The latter districts are again divided into patrol districts, each guarded by a forest ranger. Between July 15th and October 15, 1899, there were employed about three hundred and fifty of the rangers, under thirty-nine supervisors. The superintendents, among other duties, receive the reports of both supervisors and rangers, and convey them eventually to the United States Land Office at Washington, where they are filed. The table below is compiled from Commissioner Hermann's statement, and amended to include the new Reserves in Arizona and California:—

Districts.	Acreage.	No. of Supervisors.	No. of Rangers.
1. Arizona and New Mexico.....	7,647,520 ±	6	42
2. Northern California.....	4,923,535	4	34
3. Southern California.....	3,929,594 ±	5	55
4. Colorado and Utah.....	4,046,720	7	34
5. Idaho.....	3,997,160	3	26
6. Montana.....	5,040,000	4	38
7. Oregon.....	4,653,440	3	40
8. South Dakota and Wyoming...	4,407,840	4	45
9. Washington.....	8,121,880	3	34

ANNUAL REPORT OF
THE COMMISSIONER
OF THE GENERAL
LAND OFFICE.

This report for the last fiscal year has recently appeared. While there is much matter of general interest, the only rulings or recommendations we shall consider are those of vital interest to the forests of the

West. Although sheep were permitted to graze on the Sierra forest reserves in 1898, the Land Office decided that the concession was

greatly abused, and that much damage was done to the reserves thereby; sheep were therefore entirely excluded from the California forest reserves in 1899, as they were from those of Idaho, New Mexico, and South Dakota. * In the other seven States and Territories they were allowed in the reserves under certain restrictions. No doubt this same question will come before the Land Office in 1900.

In the Commissioner's Report published in 1898, he said: "I am of the opinion that all public lands which are of more value for forest uses than for other purposes should be withdrawn from entry or other disposal as rapidly as it is practicable to make the necessary examinations, and be set apart as *forest reservations*. I am fully in accord with the opinion expressed in a report recently received in this office to the effect that 'no good reason can be given for the maintenance of the present reserves which does not also demand the withdrawal and protection of all similar lands now held by the Government.' Until this is accomplished this office is greatly handicapped in its efforts to prevent the spoliation of these lands." The Land Office, in accordance with this policy, has instituted examinations of the unreserved forest, so that "*nearly fifty cases of proposed reserves or extensions of existing reserves are at present under consideration by this office.*"

The American Forestry Association, meeting in 1899 at Los Angeles, adopted a resolution of similar purport to the above, and especially asked for the reservation of all Government forest land about the head-waters of the Sacramento River of California and its tributaries. The Sierra Club has also adopted a resolution asking for the Sacramento reservation, and forwarded it to Congress; and it is gratifying to know that this proposition, which has appeared to the Club as very important to the welfare of the State, has been received favorably by our Congressmen.

The Commissioner further desires to have Congress "*authorize the Secretary of the Interior to rent or lease lands within the forest reservations for any purposes not incompatible with the purposes for which such reservations are created.*" This is a matter that deserves the very careful scrutiny of the friends of forestry. The Sierra Club is already on record as against leasing any portions of the California reserves for grazing purposes; and we think its position is a sound one. It might be urged with great effectiveness that the United States Geological Survey is at present engaged, together with the Division of Forestry, in examining all the existing reserves, with a view of recommending to Congress what portions shall be permanently reserved and what may be more justly thrown open for agricultural or grazing uses. Why is it not best to await their report, and then completely segregate from the reserves

those portions which expert testimony recommends for other uses? It would then be an easy matter to declare by enactment against the dangerous policy of leasing the forest reserves.

The Commissioner recommends that the "sum of \$300,000 be appropriated for the expenses during the fiscal year ending June 30, 1901, for the forest service in connection with the creation and administration of forest reservations." The last appropriation was \$175,000, and it had been the same in the preceding year. In view of several reserves added during 1898-1899, the prospect of more in 1900, and, what is more important still, the needs of the increased ranger system, and demands made on the Division of Forestry, the amount asked for in 1901 seems only too small.

THE LOS ANGELES
MEETING OF THE
AMERICAN FORESTRY
ASSOCIATION.

This was held July 19th and 20th, with the Vice-President for California, Abbott Kinney, in the chair. There were present a number of the Government experts in forestry and hydrography, among them Messrs. Pinchot, Newell, Lippincott, and Mead, all of whom gave important addresses, and a few papers were presented by Northern Californians; but the bulk of the papers were from the citizens of Southern California. These ranged through the problems of forestry and irrigation engineering and physics, and, in the opinion of the older members of the Association, they were not inferior in merit to those of any previous meeting. I do not believe there is any region of similar area in the United States that could show as much intelligent interest in these questions. The audiences were fairly large, and for the most part made up of men in the prime of life. Southern Californians have a clear understanding of the relation of the forests to the development of their lands, and much of this can be attributed to the unwearied efforts of Vice President Kinney.

The more important of the addresses of local origin have been printed in *The Forester*, the organ of the Association, and a journal which every one interested in the Pacific forests should read.

One important result of this meeting—perhaps the most important—was the bringing to California, and into intimate relations with her citizens and her best interests, of several of the Government experts in forestry, hydrography, and geology. Some of them have been engaged on our problems, but through this meeting and the Irrigation Convention, held in San Francisco in November, have become deservedly better known to our people. Others have practically taken up our problems for the first time. The result of their presence this year will be of inestimable value to the future of forestry and irrigation interests on this coast. Mr. Pinchot, chief of the United States Division of For-

estry, after the meeting, came to San Francisco, met its Board of Trade, and through his tact and ability won their very favorable hearing. The redwood lumbermen subscribed a considerable amount, which was placed in his hands, to investigate, through his assistants, the capacities of the redwood forests of the north to reproduce themselves, thus bringing home to them for the first time a question of practical forestry. Congressman Kahn agreed at this Board meeting to advocate in Congress a bill appropriating a certain amount for the establishment of several schools of forestry at as many universities in the United States; the hope being to secure in this way an amount sufficient to establish one of these schools at the University of California. In anticipation of this, Senator Perkins has recently introduced a resolution in Congress asking the Government to assign the use of the Lake Tahoe Forest Reserve (over 135,000 acres) to the University of California for practical purposes in connection with a school.

THE SCHOOL OF FORESTRY, UNIVERSITY OF SOUTHERN CALIFORNIA.

One of the most gratifying evidences of the growth of the forestry sentiment in Southern California is the flourishing condition of the above-named school, established a year ago. Mr. Kinney is one of the lecturers, and has done more than any one else, perhaps, to organize it. One had the pleasure of hearing a number of their lectures at the Forestry Association meeting, and could perceive how the formation of this school had reacted upon the local civil engineers and others to greatly increase their interest in the forestry problems. A number of the forestry students in this school were in the mountains acting as rangers during the summer. We hope that this school may obtain from the Department of the Interior the use of the San Gabriel Forest Reserve, following the plan of the Montana College of Agriculture and Mechanic Arts, in securing, last year, the use of the Gallatin Forest Reserves. Indeed, we believe that connecting the work of the economic departments of the universities and colleges with the American problems of forestry and irrigation cannot be carried too far, if it is all done, at least for the present, under the general supervision of the Division of Forestry at Washington.

TWO SUGGESTIONS TO THE ADVOCATES OF FORESTRY.

In order to keep the administration of our growing forest reserves out of the hands of mere inexperts like political appointees, and build it up on a basis which will command the respect of Congress and of the people,—a basis of expert knowledge, and admirable *esprit de corps*, such as underlie the United States Geological Survey,—the time has

come, it appears to us, for the friends of forestry to urge everywhere the immediate development of the United States Division of Forestry, and to assist it in every way. We have the Geological Survey as an example; we have the results of its work as an incentive, and the high respect accorded it by Congress as an encouragement. Moreover, we have in Mr. Pinchot a man who is everywhere looked upon as a man capable of building up a great Government bureau, on the basis of efficiency and honesty.

On the other hand, the simplification and classification of our irrigation laws, and their establishment on a foundation of justice first, and scientific and economic principles next, appears to us as one of the most important problems the West has to deal with. One of the few results—so far as a layman can see—of the great Irrigation Convention held in San Francisco on November 14th, was the demonstration of the utter inadequacy of our irrigation laws to meet the demands of modern irrigation projects. One of the chief incentives urging the Sierra Club to throw the weight of its little influence in favor of reserving *all* the forest land surrounding the great valleys of California and retaining it forever in the hands of the United States Government (in whose justice and efficiency we all really feel greater confidence than in that of any State) has been the hope of forestalling monopoly, whose capital is otherwise sure, sooner or later, to acquire every water-right in the Sierra streams, and to place such a tariff on the supply that all the cultivated land will fall into the hands of the monopolies themselves. At least, the writer has believed that Government control of the Sierra would insure to California low water-rates, equity in distribution, the planting of thousands of small landholders in the great valleys, and lasting prosperity to the State; that monopoly control would bring high water-rates, discrimination, and ultimately great syndicate farms, owned by capital foreign to the soil. Then the question arises, with the real residents reduced to employees or workmen, would any long-continued and real prosperity be possible in the great central valley of California. If, as experts in irrigation seem to fear, "precedent in law" apparently gives, in many cases, a water company which has laid hold of the mouth of a mountain stream rights extending to its source, equity would seem to demand a complete reorganization of our irrigation laws, and their formulation on the principles already worked out, we understand, by Australia, where they are said to be just to all concerned and to work without friction. Here, it appears, is more work for the Sierra Club.

The French Government has long had, if we mistake not, a bureau of "Eaux et Forêts," recognizing, as we are beginning to do, the intimate relations of the waters and the forests. The tre-

mendous moneyed interests sure to be involved in course of time in connection with these two subjects, the necessity of scientific knowledge and long training for the administrators, suggest a similar department of waters and forests on the same footing as the greater Government bureaus, and controlled by a director free from political appointment.

FOREST FIRES. The past season has been marked by an unusually large number of forest fires. The writer has sent a large number of letters to all the forested parts of the State, and thereby brought together information showing that the area burned over is far beyond what is known even by close observers of the press reports. He proposes to continue this inquiry, and present the results in the May BULLETIN.

"PRIMER OF FORESTRY" Finally, we wish to call the attention of readers to Mr. Pinchot's *Primer of Forestry* (Part I), published by the United States Division of Forestry as their Bulletin 24, for free distribution. It is by our best authority, is simple and lucid in style, is freely illustrated with many photographs, often from our own Pacific forests, and will surely have a great educating influence, if widely distributed.

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All communications intended for publication by the SIERRA CLUB, and all correspondence concerning such publication, should be addressed to the Assistant Editor, J. S. Hutchinson, Jr., Sierra Club, Merchants' Exchange Building, San Francisco, California.

Correspondence concerning the distribution and sale of the publications of the Club, and concerning its business generally, should be addressed to the Secretary of the Sierra Club, Merchants' Exchange Building, San Francisco, California.

False
Matterhorn. ↓ Matterhorn
 ↓ Peak.



SAW-TOOTH RIDGE, FROM THE DIVIDE BETWEEN TWIN CAÑONS AND
SLIDE CAÑON — LOOKING EAST.

(The highest peak on the right is Matterhorn Peak; the sharp, isolated peak just to the left of it is the false Matterhorn.)

Photograph by J. S. Hutchinson, Jr.

SIERRA CLUB BULLETIN.

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NO. 2.

LAKE TAHOE IN WINTER.*

BY JOHN MUIR.

The winter glory of the Sierra! How little is known of it! Californians admire descriptions of the Swiss Alps, reading with breathless interest how ice and snow load their sublime heights, and booming avalanches sweep in glorious array through their crowded forests, while our own icy, snow-laden mountains, with their unrivaled forests, loom unnoticed along our eastern horizon. True, only mountaineers may penetrate their snow-blocked fastnesses to behold them in all their white wild grandeur, but to every healthy man and woman, and even to children, many of the subalpine valleys and lake-basins, six or seven thousand feet above the sea, remain invitingly open and approachable all winter.

With a friend and his two little sons I have just returned from a week of bracing weathering around Lake Tahoe, in which we enjoyed glorious views of winter, fine rolling and sliding in the snow, swimming in the icy lake, and lusty reviving exercise on snow-shoes that kept our pulses dancing right merrily. All the weather was hearty and exhilarating, though varying almost from hour to hour:—

* Reprint of a letter published in the *San Francisco Bulletin* in 1878.

snowing, blowing, clear and cloudy, but never rigorously cold.

This winter has been remarkably mild, the mercury having seldom made a very near approach to zero, even during the coldest nights around the lake, while the average noonday temperature was considerably above the freezing-point. The snow lies deep on the surrounding mountains and about the shores, solid white contrasting with the dark-blue water of the lake, while the forests and cañons and the upper glacial fountain hollows are well filled, assuring abundance of summer water for the lakes and streams.

According to the record kept by Mr. McKinney, on the west shore of the lake, eight miles above Tahoe City, at an elevation of 6,500 feet above sea-level, the amount of snow, measured as it fell, was twenty-two feet and four inches for the season up to March 20th, with four inches of rain, while an inch or two more of rain and two or three feet of snow will probably fall before the full opening of spring. Last season the snowfall, measured by the same observer, at the same station, was only nine feet and seven inches, while the season before last it was no less than forty-seven feet and six inches. The fall about Yosemite Valley, according to my own observations, usually considerably exceeded this. The greater portion of the snow that loads the main summits of the range falls in small crisp flakes and broken crystals; or when accompanied by strong winds at a low temperature, the crystals, instead of being locked together in tufted flakes, are driven against each other and broken into meal and fine dust which darkens the sky like night. But down in the forested region, at about the elevation of Lake Tahoe, the greater portion comes gently to the ground, light and feathery, some of the flakes in mild weather being nearly an inch in diameter, and is evenly distributed and kept from drifting to any great extent by

the shelter of the woods. Every tree is loaded with the fairy bloom, bending down the branches, and hushing the singing of the elastic needles. When the storm is over and the sun shines, the dazzling snow at once begins to settle and shift and fall off the trees in miniature avalanches; then the relieved branches spring up and shake themselves dry, and the whole green forest, fed and refreshed, waves and sings again rejoicing. The snow on the ground settles also, and thaws and freezes until it becomes coarsely granulated ice, with all trace of its crystalline snow structure destroyed. This is the present condition of most of the snow on the range. From towards midnight until midday at this time of year a man may walk firmly over the surface, as if on ice, provided the preceding day has been warm and the night frosty.

The forested region up to an elevation of about eight thousand feet is generally clear of snow towards the end of May or middle of June; but now (March 28th) the higher cañons are still heavily blocked, and the head tributaries of the rivers flow in dark tunnels beneath the icy mass. As warm summer advances, the roof of compacted snow falls in here and there, leaving magnificent arching bridges where it is strongest, over which one may safely ride a horse. All the upper streams are thus buried and bridged every winter, and are seldom completely opened to the light before the end of June or middle of July.

Notwithstanding twenty-two feet of snow has fallen here this season, so greatly has it been melted and compacted, the present average depth at a height of 7,500 feet does not exceed seven feet. The drifts in exposed lake hollows and along the lee sides of bald ridges above the timber-line are often fifty feet or more in depth, and many of the latter are grandly adorned with overcurling cornices, beneath which pale blue light shimmers with ineffable beauty. But it is in the fountain cirques of the ancient glaciers, beneath the

shadows of the highest peaks, that the heaviest and most enduring deposits are stored up. For there the lavish snowfall on the steep converging slopes is shot down in avalanches during or after every storm, heaping snow on snow to a depth of a hundred feet, or even more at times. These treasured banks are never wholly melted, however hot the summer, but with the few lingering glaciers form perennial fountains for the highest tributaries of the rivers.

Few even among Californians have any fair conception of the marvelous abundance of glacier lakes hidden in the fastnesses of our mountains. The snow and some of the glaciers make a telling show, even from the distant lowlands; but not a single stream is visible, nor a hollow where one might hope to find a lake. Nevertheless, wild rivers are falling and sounding in every cañon, and all their upper branches are fairly laden with lakes like orchard-trees with fruit. They nestle in rocky nooks and hollows about all the high peaks and in the larger cañons, reflecting their stern, rugged beauty and giving charming animation to the bleakest and most forbidding landscapes. From the summit of Red Mountain, a day's journey to the east of Yosemite Valley, forty-two may be seen within a radius of eight or ten miles. The whole number in the Sierra can hardly be less than fifteen hundred, exclusive of the smaller gems, which are innumerable. Perhaps two-thirds of them lie on the west flank of the range, and all are restricted to the alpine and subalpine regions, those which once brightened the lower regions having long since vanished by the filling in of their basins. Lake Tahoe is king of them all, not only in size, but in the surpassing beauty of its shores and waters. It seems a kind of heaven to which the dead lakes of the lowlands had come with their best beauty spiritualized. It lies embosomed in mountains of moderate height near the northern extremity of the high portion of the

range, between the main axis and a spur that puts out on the east side from near the head of the Carson River. Though it is twenty-one miles long by ten wide, and from about five hundred to sixteen hundred feet deep, its basin was once occupied by a glacier which filled it from the bottom to a point high above the present water-level, and being lavishly fed by the snows of the encompassing mountains, crawled slowly, like a mighty river, over the north rim of the basin, crushing and grinding the lower mountains that lay in its way, and it was only at the end of the ice period that this noble lake, at least in anything like its present form, came into existence.

Excepting the forests that have sprung up around its shores, the post-glacial changes that have taken place are scarcely appreciable. The sediments carried forward by the inflowing streams at the head of the lake have made a few square miles of meadow-land, and the breaking through of a moraine dam in the cañon of the outlet has lowered the lake considerably, leaving shore benches and lines on the rocky promontories to mark the original level. With these comparatively unimportant exceptions, the lake itself and all its grandly sculptured, ice-scored, and moraine-streaked basin exist to-day in just about the condition they presented when first they came to the light towards the close of the Glacial Period.

The destructive action of man in clearing away the forests has not as yet effected any very marked change in general views. Perhaps about 150,000,000 feet of lumber for the Comstock mines has thus far been cut from the lake shores. But the business is being pushed so fervently from year to year, almost the entire basin must be stripped ere long of one of its most attractive features. One of the lumber companies at work here has contracted with mine-owners to supply 36,000,000 feet of lumber and 60,000 cords of wood this season. It is estimated that the Tahoe

basin still contains about 600,000,000 feet of lumber available for the mines.

In summer the woods resound with the outlandish noise of loggers and choppers and screaming mills; skiffs and steamboats skim the lovely blue water in work and play; and ever and anon as you thread the groves along shore you come upon groups of gay tourists sauntering about, gathering flowers, or resting luxuriously in the rosinny shade of the pines, some in easy picnic attire, others all ribbons and colors, glaring wildly amid the green leaves and frightening the wondering squirrels and birds. But winter brings rest. At sight of the first snowflake pleasure-seekers flee as from a plague, the ax leaves the woods, and the kind snow heals every scar. Contemplating the basin from any commanding hilltop, only pale curls of smoke seen at wide intervals betoken the existence of human dwellings. Like the bears, the few settlers that remain here are silently "holed up." The snow covers their cabins as if they were boulders, and when approached only a narrow shoveled-out passage, or tunnel, is found leading to the door. Some of the more enterprising winter dwellers drift about in boats in calm weather, catching trout for the Carson market,—for the lake, on account of its great depth, never freezes. They thus earn from thirty to forty dollars a month, and at the same time get rid of lonely dullness. A trapper may also be seen now and then shuffling along the shore on long Norwegian snow-shoes in pursuit of minks, fishers, and otters.

In this letter I intended only to say a good word for winter in the mountains, hoping to incite others to come and enjoy it, sketching our excursion to illustrate the ease and comfort with which such snowy winter rambles may be made; but I have written too much I fear about the snow to leave room for more than a thin outline. We went by rail to

Carson, and from there set out by stage for Glenbrook. After ascending on wheels until we reached the snow-line, the driver attached his four horses to a sled, hoping thus to cross the summit, which is less than eight thousand feet high, without much difficulty. But mild weather had softened the snow, and the unfortunate animals, after floundering and wallowing through a mile of it, lay down exhausted with their heels in the air. Then we made our way on foot over to the lake. Next day, on a small steam-tug, we crossed the lake to McKinney's, on the west shore, where we were at home. Here we spent a few health-giving, delightful days, rowing, bathing, racing at lightning speed on snow-shoes down a mountain-side back of the house, and slipping about through the solemn, silent woods. Only the eldest of my companions ventured with me on the steep slopes. This was his first experience on snow-shoes, and the several descents he made were the most remarkable specimens of falling locomotion that I ever had the fortune to witness. In shooting down steep declivities the long sled-runner-like shoes have to be kept parallel with firmly braced limbs. My friend, however, heedless of advice, launched himself in wild abandon, bouncing and diving, his limbs and shoes in chaotic entanglement, now in the snow, now in the air, whirling over and over in giddy rolls and somersaults that would shame the most extravagant performances of a circus acrobat. How original and inimitable he was! Wonderfully refreshing and exhilarating his queer capers must have been; for on coming to rest, with his runaway members divorced and lost, he would quietly gather himself, pick out the snow from his neck and ears, and say with preternatural solemnity, "This, Muir, is the very poetry of motion."

We also spent some rare evenings by the huge fire in McKinney's old cabin. The log walls are covered with trophies of the chase, for our host has been a great hunter

in his day. Two live pet coons were frolicking on the floor while our grand old host smiled benignly and played with them, the firelight gleaming on his weathered face. How big he seems, thus brought into relief, and what a shadow he casts! The fragrant rosiny fire is the very god of the home. No wonder the old nations, with their fresher instincts, had their fireside gods.

At last, when a mild snow-storm was blowing, we rowed to the lower end of the lake and completed our excursion by slipping on snow-shoes down the Truckee cañon to the railroad.

ASCENT OF "EL YUNQUE."

BY N. F. McCLURE,
First Lieutenant Fifth Cavalry, U. S. A.

Mountain-climbing in Porto Rico is fraught with difficulties which are almost unknown in our grand old Sierra Nevada. The boggy, wet ground, the continual humidity, the heavy undergrowth, and the excessive heat unite to make the task one of considerable hardship. In addition to this, the chances are about ten to one that after reaching the summit it will not be possible to get a good view, on account of the fog and clouds. However, the mountains are not, as a rule, very high, and it is not very cold on the summit; hence one may make another ascent or remain near the top all night in the hope of getting a more favorable view on the morrow.

In the northeast corner of Porto Rico stands a great peak called "El Yunque de Luquillo." The high range of which it forms the main feature is called the Luquillo Mountains, and "El Yunque de Luquillo" means "The Anvil of Luquillo." Its resemblance to this implement is very marked when viewed from a point on the high-road half-way between Fajardo and Luquillo.

On March 15, 1899, I camped on the Mameyes River about one mile above the mouth. I made some inquiries, at that time, about El Yunque, which lay several miles directly south of my camp, but was told that the ascent was extremely difficult, and that there was no one in the neighborhood who knew the way. This information, together with a heavy storm of rain and wind which raged during

the afternoon and evening, discouraged me so much that I decided not to try to climb the mountain alone, though I had fully intended doing so. Next day, while passing through Fajardo, on my return, I met the postmaster at that place, Mr. Gilbert, and he informed me that Captain A. C. Hansard, formerly an officer in the English army, lived not far from "El Yunque," and had been to the top. Immediately upon reaching Humacao, I wrote to Captain Hansard on the subject, and a few days later received a reply. He stated that the ascent was a very trying one; that it would take all day to go up and return; and that, as the rainy season was coming on, it would add much to the difficulties of the attempt. He also kindly offered to secure for me the services, as guide, of the only man besides himself who knew the way, and to render me every other assistance in his power.

I was at this time very busy, and the weeks slipped away until May had arrived. At last I decided that it was a case of "now or never," since I felt that it was more than probable that by the next favorable season I might be in another part of Porto Rico, or perhaps not on the island at all. I believed that it would be of great interest to the members of the Sierra Club to hear something of the mountains of this new possession of the United States, and I wanted to have the honor of being the first member of our Club to add this peak to our conquests.

On May 12, 1899, I at last rode forth from Humacao at the head of a little detachment of one sergeant, two privates, and a packer, all belonging to my troop. I was also accompanied by my wife, who had often been with me on such jaunts. For two days we traveled through the foothills of the mountains, remaining several miles inland. The country was beautiful. The green hills, the dashing, sparkling streams, the fertile valleys, the mountains to the left of us, and the sea in the distance to the right, united to

form a succession of landscapes which can scarcely be surpassed.

On the afternoon of the 13th, my detachment went into camp at Captain Hansard's coffee estate, "La Perla." He informed me that it was very late in the season, and that the attempt would now be very difficult, but that it was barely possible that I might even yet secure a favorable day. He at once sent a boy a distance of five miles to the estate of Don Luis Gonzales to secure the guide, and in this he was successful. Sergeant Capple of my troop ("C," Fifth Cavalry), volunteered to accompany me. The details having been previously arranged, we were in the saddle by five o'clock on the morning of the fourteenth. It was quite dark, but the trail being good at the start, we made excellent time. By daylight the route became much steeper and was boggy in many places, but notwithstanding these facts we pushed on rapidly and reached Don Gonzales' house at 6:15 A. M. This place is at an altitude of about one thousand feet on the Mameyes River, about one-third the distance from its source to its mouth. Here we found our guide awaiting us, and we at once crossed the river and began our climb, leaving our horses behind to be taken back to La Perla by one of my men. At first we passed up the hill through some partly cleared land, and at the upper edge of this our guide, after whistling several times, was joined by another Portorriqueño, evidently a companion of his. This man, I found afterwards, had never been up before. We now entered a virgin forest whose beauty it would be difficult to describe. Royal palms, giant tree-ferns, mameyes-trees, long swinging vines of great length and strength, hundreds of varieties of timber, shrubs, and flowers, whose names we did not know, constituted a forest of tropical splendor and magnificence.

The walking now became very difficult, everything being damp and slippery and the trees and undergrowth very

dense, thus shutting off all breeze. A heavy fog soon settled over the country, and while this protected us from the intense heat of the sun, it nevertheless made it impossible for us to see where we were going. Here, the necessity of having a guide became apparent. Without him, under these circumstances, we would have been completely at a loss. After ascending several hundred feet we came to a ridge, and turning to our right (westward) we followed this for over half a mile. We then left it to our right, and descended to a small stream a short distance below. I noticed now that our guide followed up this, climbing over the bowlders when necessary, but never leaving it. There were two reasons for this, though both were at the time not apparent. One was that the stream found its source very near the summit of El Yunque, and the other was that the undergrowth was so heavy on either side that the waterway afforded the only open route. Even here the two natives were obliged, from time to time, to cut a passage with their machetes through the overhanging vines and plants.

At 8:30 A. M. a heavy shower came on, and we took refuge for ten minutes under a ledge of rock. I was now filled with gloomy forebodings, for the clouds and rain made it almost certain that when we reached the highest point we would be unable to see anything. As soon as the shower let up a little I pushed on, for I feared from all I had heard that the afternoon would be well along before we reached the summit. We were soon soaking from the dripping foliage; but it needed not this to make us wet, for perspiration rolled from us. There was but little evaporation, and for this reason when once wet we remained so for the rest of the day. The timber grew smaller as we ascended, and when we finally quit the little stream near its source there was nothing left but a heavy growth of shrubbery and tropical plants, none of which rose to any consid-

erable height. About two hundred feet above the point where we left the stream, the bushes became so matted together that we were obliged to get on top of them and work along for about one hundred yards at a distance of eight or ten feet above the ground. Then, suddenly, we came to a little open space which had been cleared away, and our guide informed us that we were on the summit. I could not believe it, as it was not yet ten o'clock. I was bitterly disappointed, for the heavy fog obscured everything. I asked the guide if he thought it would soon clear up, but received no encouragement.

There appeared to be absolutely no hope of getting a view that day. Sergeant Capple now busied himself in trying to make a fire, for both ourselves and the natives were chilled by the strong wind blowing on our wet clothes. It was the first time that I had ever felt the desire for a fire since my arrival in Porto Rico, and it is worth while to make this trip just to experience this sensation. In looking about for some dead wood, I noticed some bushes that had been previously cut, and upon examining them found the trunks and leaves were still green. In astonishment, I asked the guide if he knew how long they had been cut. He replied that he had cut them when on the mountain nine months before. They were still living, and apparently as fresh as ever. This phenomenon is due probably to two causes, viz: to the nature of the shrub, and to the extreme dampness of a place where rain falls on almost every day of the year. A few days later, while mentioning this discovery of mine to a friend, I was shown another plant growing near the seashore whose leaves lived for several months after being plucked.

About half an hour after our arrival, the sun suddenly burst through the fog, but disappeared again in a few seconds. This was repeated a number of times, and my hopes began to revive. At about eleven o'clock Sergeant

Capple, whose first name is Eli, succeeded in kindling a good fire out of wet wood. The guide was much surprised at this perseverance, and assured us that it was the first fire ever built on El Yunque, as the extreme dampness there made such a feat almost impossible. It was literally a case of "Get thar, Eli!" and he "got thar."

Just after this I arose from the fire, stepped to the eastern edge of the little clearing, and looked over. I could not help uttering an involuntary shout of triumph, for there, spread out at my feet, lay the whole eastern end of the island of Porto Rico. Under the influence of a strong wind and the sun's powerful rays, the fog was being rapidly dissipated. In twenty minutes the land was clear, though the mist still hung over the sea in a radius of thirty or forty miles. For this reason, the view was not perfect, but nevertheless I considered myself unusually fortunate to get even this half a loaf.

The entire eastern part of the island was in plain sight. The towns of Guayama, Fajardo, Rio Grande, and Carolina were distinctly visible, and, the capital city, San Juan, together with the harbor of the same name, formed a picture that must have rivaled that of Naples from the summit of Vesuvius. To the north, east, and south the sea stretched away until lost in the fog. All the islands along the eastern coast could be seen, Vieques (Crab) Island being by far the largest and most conspicuous. It is also mountainous, and one of its little conical peaks rises to a height of probably one thousand feet.

On account of the mist, Saint Thomas, Santa Cruz, and the rest of the Danish West Indies were not in sight, though they can be plainly seen on a favorable day. It is said that on a clear day the sea is visible from where we stood at every point of the compass, and I have no doubt that this is true. Near El Yunque are three other peaks almost as high. These four make a trapezium, of which "The Anvil"

forms the northern corner. The longer diagonal of this figure is about four miles, and the shorter about three and one half. About noon we "breakfasted," as they say in this benighted country. Among other things, the two natives had a large crawfish, caught within a mile of the summit, which they cooked on the live coals. They told us that all the mountain streams thereabouts contained great quantities of these fish.

By one o'clock in the afternoon the clouds again closed in, obscuring all below, and we began the descent. I now discovered, for the first time, how great had been my exertions in going up; for I found that my legs almost refused to support my weight, and to relieve them I often swung myself along by catching with my hands to the vines and branches overhead. The rocks were so slippery that both the sergeant and I, who wore shoes, could scarcely keep our feet. The natives, being barefooted, had a considerable advantage over us in this respect. It was about 4 P. M., when, pretty well exhausted, we reached Don Gonzales' house. He invited us in to have some beer, and after a rest of a quarter of an hour we felt much refreshed and proceeded on our journey. We covered the five-mile walk to Captain Hansard's by 6 P. M., and right glad were we to reach camp. Next day, and for several days after, I was so stiff that I walked with a limp; but Nature soon reasserted herself, and in a week I was as good as new.

The scene from El Yunque is one of the finest in the world when the weather is favorable. The combined land and sea view, the numerous cleared fields and sugar plantations below, the thousands of acres of forest, the rugged mountains, all unite to form a panorama of magnificence seldom surpassed. As to the altitude of the mountain, Captain Hansard tells me that he has twice measured it with an aneroid barometer, and made it each time about 3,200 feet; Don Luis Gonzales claims that it is 1,400 me-

ters, or 4,550 feet; while one old Spanish map gives it at 1,520 meters, or 5,000 feet. Captain A. C. Macomb, Fifth Cavalry, wrote me recently that our Geodetic Survey gave it as 3,872, while the official Spanish height is 4,080 feet; but I do not know the sources of his information. I should say that it is 3,700 feet in altitude, and as this is practically straight up from the sea-level it makes a good climb. Of one thing I am certain, and that is, that it is the highest mountain in Porto Rico. It stands the last mighty sentinel on the eastern frontier of our glorious country. The western frontier is guarded by the peaks of the Philippine Islands, nearly half-way round the globe towards the setting sun.

To any one wishing to ascend "The Anvil," I would recommend going to Captain Hansard's, six miles south of Luquillo, and getting a guide; but if for any reason this cannot be done, then "go it alone," and follow up a stream as we did. If the weather be clear, one will have no difficulty in finding the right peak. The best time to make the attempt is during what is known here as the dry season, which varies more or less, but may be said, in general terms, to include the months of January, February, and March. During this period it rarely rains more than once or twice a day, and there will be a day now and then when it does not rain at all.

Humacao, Porto Rico, May 23, 1899.

ANOTHER PARADISE.

BY BOLTON COIT BROWN.

Mr. Muir once remarked that the poorest mountaineers always have the most adventures. In the light of this, we can look back upon our two months' trip (1899) and please our pride by noting the absence of falls, predicaments, or disasters. Thoreau says,—and Lucy and I agree with him,—that “a man sits as many risks as he runs.” Applying this to our two-year-old daughter, we put her on a burro, and whither we went she went also. And she enjoyed it all—grew rosy, hearty, and hardy, just as big folks do in the mountains. She did not so much as bump her head all summer, and except for the time a rattlesnake slid too close to her, and once when an owl tried to drag her out of her little nest and fly away with her, she had no disagreeable experiences whatever. Our camping was of the simplest—no tents, stoves, or other superfluities. The child lived mostly on malted milk, chocolate, and “trout fish.” I verily believe she injured the fishing by her consumption of these last.

Our route was from Sanger, via Millwood and the “old trail” to King’s River Cañon, up Bubbs’ Creek,* past the mouth of South Cañon, and so up to Bullfrog Lake. Half a mile above the lake, a small stream flows into its inlet from the north. Upon this stream, two hundred yards above the point where the Independence Trail crosses it,

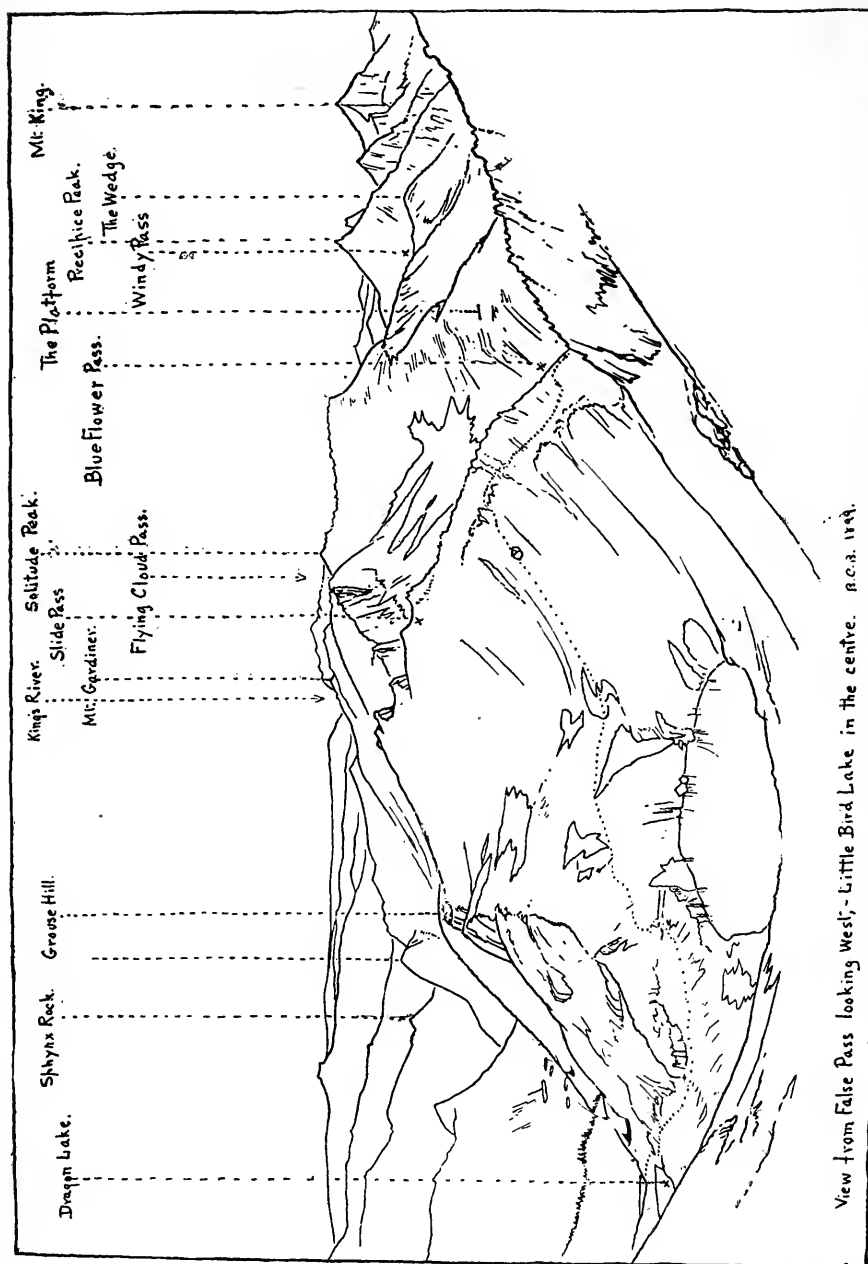
* Mrs. Brown suggests that this stream be called *Bubbling* Creek. Why not? Let Bubbs have the trail—perhaps he made that; but *why* should his unfortunate cognomen include this glorious mountain stream? Would it not be more fitting if we went up Bubbs’ Trail; and went a-fishing in *Bubbling Creek*?



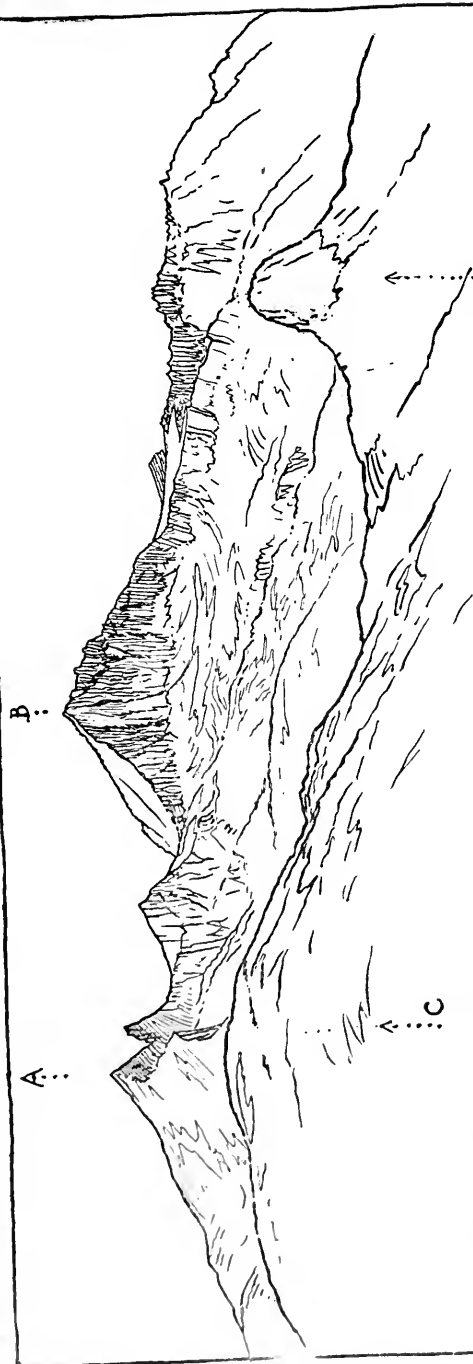
Key to Map.

- | | | |
|---------------------------------|-------------------------------|--------------------------------|
| 1. Mt. King (13,200) | 14. Lake Charlotta | 25. Slide Pass |
| 2. Mt. Gardiner | 15. Bullfrog Lake | 26. Blue Flower Pass (12,400) |
| 3. The Labyrinth Lakes (10,500) | 16. Little Bird Lake | 27. False Pass (12,800) |
| 4. Precipice Peak (13,000) | 17. Dragon Lake | 28. Knapsack Pass (13,000) |
| 5. Ultima Lake (12,000) | 18. The Fin (12,200) | 29. Flying Cloud Pass (12,600) |
| 6. Cloud Lake (11,200) | 19. The Head (12,500) | 30. Ice Sheet |
| 7. Lake Lucy (10,400) | 20. Solitude Peak (13,900) | 31. Sink Hole, - dry. |
| 8. Eleanor's Island | 21. Mt. Rixford (13,500) | 32. The Tail. |
| 9. Wonder Lake | 22. The Black Castle (13,200) | 33-34 Western Boundary |
| 10. Rotin's Egg Lake | 23. Glacier Spike | 33-34 Main Crest. |
| 11. Lake Sarnphire | 24-29 The Platform (12,200) | 41-34 Southern Boundary. |
| 35 The Wedge | 40. The Pyramid | |
| 36. Windy Pass (Sketch 5) | 41-32. The Sea Serpent | |
| 37. Grouse Hill | a. Sketch No. 1. | |
| 38. Saddle Pass | c. Sketch No. 3. | |
| 39. Island Lake. | d. Sketch No. 4. | |

All the lakes east of The Sea Serpent are the "Eastern Lakes"; - those westward of it, the "Western Lakes."



View from False Pass looking west; - Little Bird Lake in the centre. A.C. 1893.



A. Precipice Peak. C. The Head.
B. Mt. King. D. The Fin.

Sketch. No. 1. from position a on map.

at an altitude of over 11,000 feet, we camped for three weeks.

During this time I made several exploring trips into the basin next north of the Bullfrog Lake Basin. Notwithstanding its nearness to a well-known trail, the inaccessibility of this country has kept it almost unknown, and, so far as I know, quite unvisited, until this summer. It contains from twenty-five to fifty square miles, is about as wide as it is long, and, after I had gone all over it, I put it down as distinctly the finest and completest epitome of Sierra scenery I had seen. Whatever makes the charm and the peculiar character of the High Sierra is here in typical perfection — peaks, walls, precipices, snow-fields, table-lands, gorges, ice-smoothed rocks, willow-bowered cascades, mountain-pines, columbine, and many other blossoms, perfect and extensive meadows, and lakes—ah, the *lakes!*—in every variety, form, and position — fifty of them if there is one, and streams, from the tinkling, flower-splattering, grass-hidden rill to the hoarse boulder-rolling torrents. These latter—one day when I was there—sounded like an artillery-battle as they plunged their storm-swollen volumes of yellow flood down the mountain-sides. Surely that day the mountains said, as one did to Thoreau, “Here comes one of our friends; let us get up a good storm to welcome him.” Hour after hour wind-driven torrents of rain and hail came down. The ground was grayed with ice-pebbles. The lake-surfaces roared and hissed under their beating. Blinding lightning-flash and tremendous detonations of thunder-crash, peal on peal and roll on roll, filled that mighty bowl with the grandeur of elemental tumult.

This day I was out fourteen hours, and, despite the storm, cooked two hot meals. I arose at half-past two, and at the crack of dawn left camp for Flying Cloud Pass. My route is dotted on the map. I traveled very slowly,—merely wandered, in fact,—lying under rocks at the heaviest

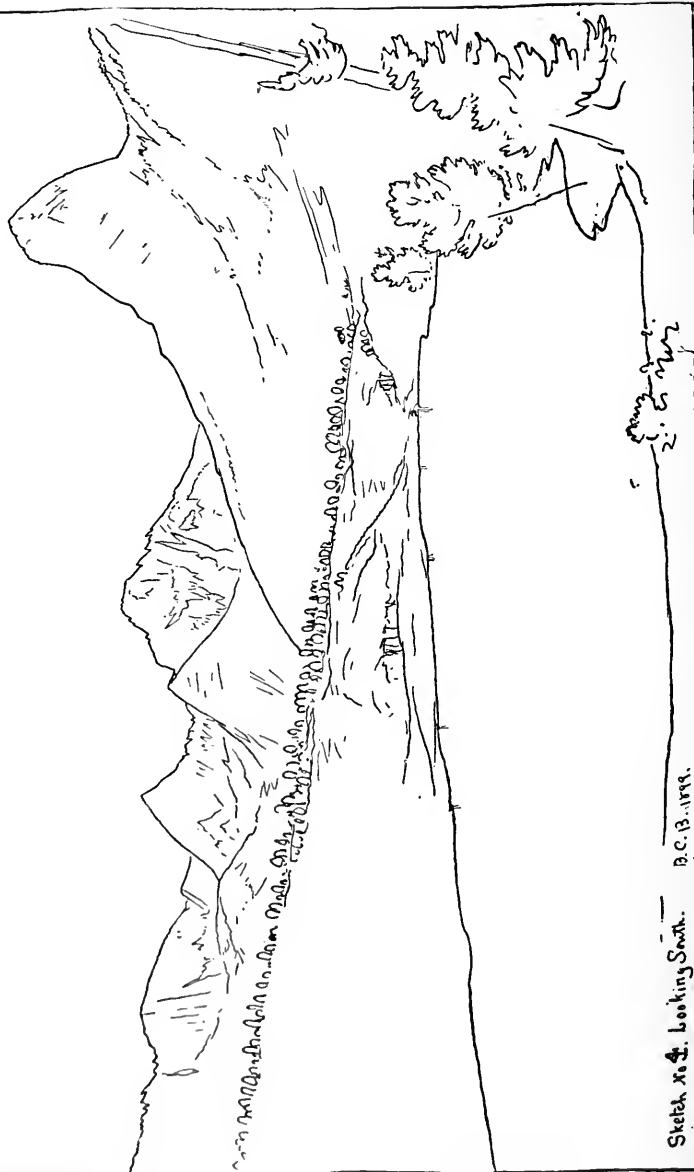


Sketch 2.
Flying Cloud Pass.
Solitude Peak to the left.
Cloud Lake below. Looking South.



The Black Castle. Mt. Rixford.
The Pyramid.

The Fin.



Sketch No. 4. Looking South. J. C. 1899.

storm-gusts, working out bits of trail, making in the less fierce moments dripping sketch-notes of the scenery, and so on until late in the afternoon, when the breaking storm found me toiling up the northern wall of the southern ridge. Reaching the summit just at sunset I saw from Knapsack Pass our camp-fire two thousand feet below. Lucy heard me shout from here. Down the long slope I went with leaps and bounds a kangaroo would have envied, and in twenty minutes reached camp.

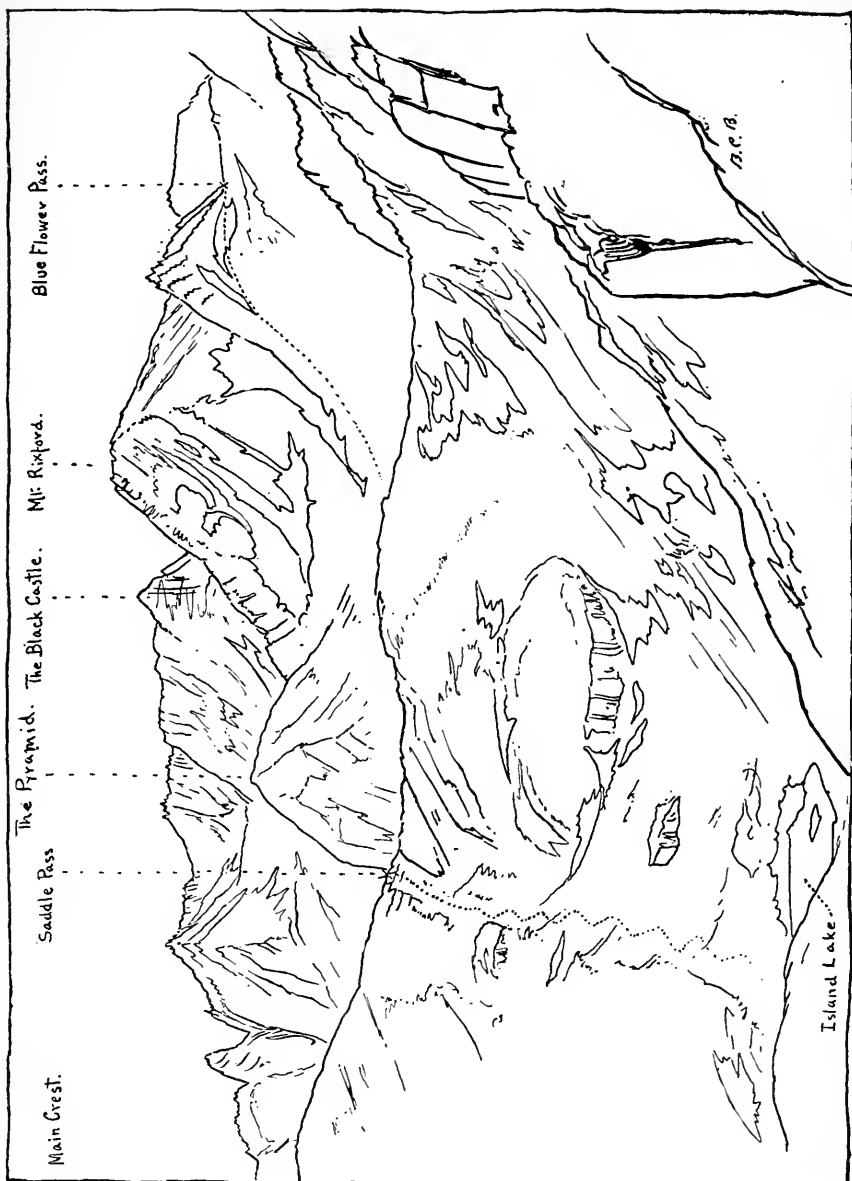
Lucy and the baby had made a good fight against the storm, but the channelings of the water showed that they had almost been washed away. Packed in dry blankets, the child sat for several hours under the six-foot tarpaulin roof quite contented, listening to the thunder and watching with baby-wonder the accumulating hail-piles — “Just like washing rice,” she said. Her mother had kept a great roaring fire hard by all day, and withal no one was the worse for the storm.

One morning Lucy left camp (I stayed with the child) and crossed the divide at False Pass (see her route dotted on map), descended to the Eastern Lakes, tramped down northward below the Fin, returned over the divide by Blue Flower Pass, and walked into camp about five o'clock. Doubtless she was the first woman ever in that basin. Some friends of ours visited the region a little later and named the largest lake after her. I named one of its islands after the infant — Eleanor's Island. I hasten to add that I should not have done it had she not possessed a suitable name.

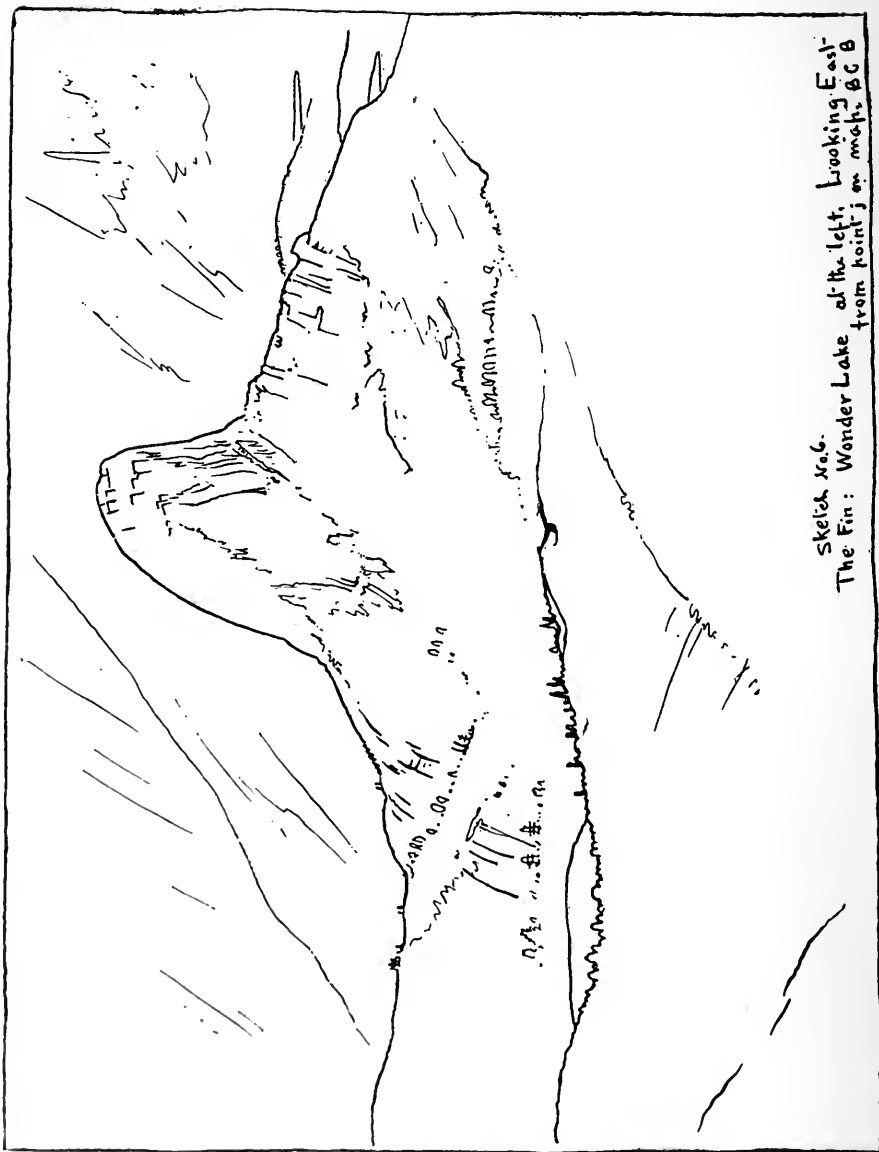
Earnestly desiring to find an animal pass to this basin, I explored every foot of the crest of its northern wall from Kearsarge Pass to Flying Cloud Pass. The discoveries I made are on the map. Flying Cloud Pass has certainly been used by sheepmen as an animal pass; but its northern side is rough and should be seen before being attempted.

False Pass and Knapsack Pass are convenient for foot-travel, but impossible for animals. False Pass has a *very* steep and very long descent on the north. I descended once along the channels of the northeast face of Mt. Rixford, but I cannot recommend it. It is dangerous. Slide Pass appears to have been used by sheepmen; but here again one should work out his route before attempting to take animals over it. Not very far to the west of Slide Pass is a narrow gate through the crest, and this also the sheepman has undoubtedly used, though whether for pack-animals or sheep only, I cannot say. It was a mere ribbon of steep snow on the north when I visited it. Blue Flower Pass is my own private discovery, and I was much pleased with it until, after monumenting its northern side almost down to the basin's bottom, I came to a passage through bed-rock on edge. I worked an hour or two building steps here, but still I cannot report it as passable. But a certain amount of work — not more than a few hours, I should say,—ought to make it possible. The southern approach to this pass is not very difficult,—that is, for real mountain animals.

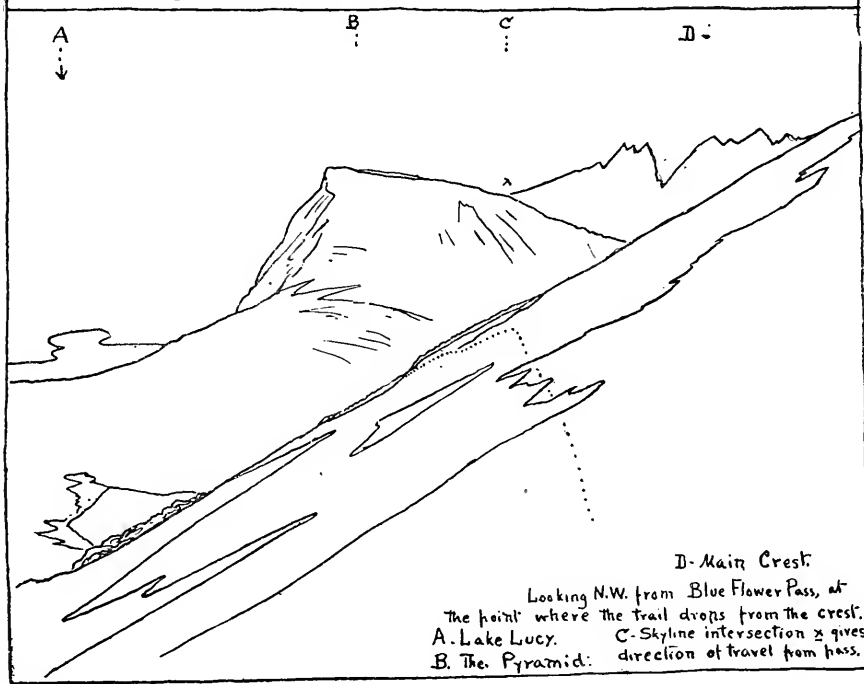
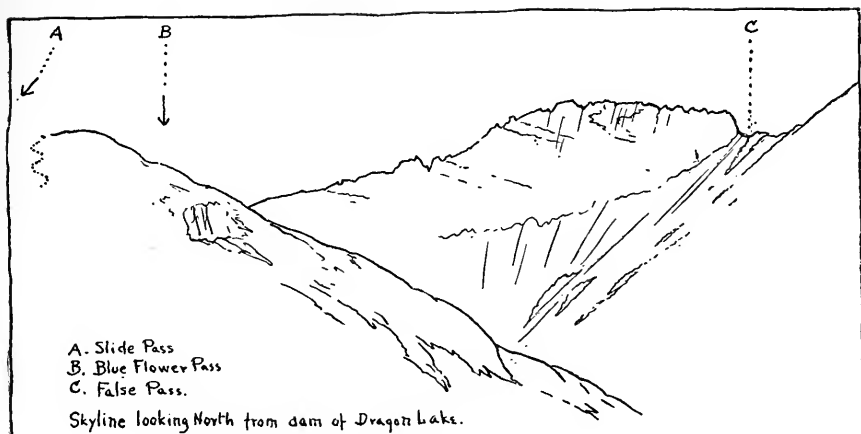
As to the map herewith, it will be found quite practicable to travel by, though no doubt in such things as the relative sizes of lakes it is very funny. Moreover, there are a great many more lakes in the basin than are shown on the map. Taken in connection with the topographical sketches, it should enable any one, without loss of time, to go to any part of the basin. It is to be hoped that another season will see found or made a reliable animal trail over this basin's southern wall. Once down to either the eastern or the western group of lakes, there would be no serious difficulty in moving pack-animals almost anywhere. The western lakes are on a sort of shelf, and must be some six hundred feet higher than the eastern chain. At either group plenty of feed is to be found; and the defacement



Sketch No. 5. Looking S.E. from Windy Pass.



Sketch No. 6.
The Fin: Wonder Lake, at the left, Looking East-
from point j on map, BC B



and destruction by sheepmen have been less here than in any place I have visited. My first thought was, "*This* is the kind of High Sierra that John Muir talks about in his book."

Mr. Geo. W. Naylor, of Independence, (forest ranger,) told me that an "old prospector" once told him that twenty years ago he had taken his animals over this divide just north of Bullfrog Lake. On the strength of this I made a special search for his pass, but failed to discover any place where it seemed even remotely possible to put an animal over. Mr. Naylor, after visiting the basin, agreed with me as to its extraordinary beauty, and desiring to have it quite perfect, he next day took his companion, and between them they carried over a pail containing a dozen trout, which fish they liberated in the hitherto fishless waters of Lake Lucy. And, by the way, speaking of trout, three years ago I carried up from Bullfrog Lake nine large trout and put them in the Kearsarge Lakes. Having this summer investigated the matter, I can report that they flourished, and that now there are trout in *every* lake between the Main Crest and Bullfrog Lake. Mr. Naylor made this true this summer by taking fish away up to the last glacial pond just at the northwest foot of University Peak.

Mr. Naylor heard of a pass into this northern basin by way of its western wall—somewhere near Ultima Lake. Being determined to get in there to camp, he took his animals and disappeared, aiming to cross the first divide somewhere a mile or two west of Flying Cloud Pass, and, descending thence on the western side of the basin's western wall, to cross that wall, as I said, near Ultima Lake. As he never came back, I suppose he got in.

This basin could no doubt be reached with animals by crossing over from the Copper Creek Basin into Paradise Valley, ascending to the head of that, thence following its eastern fork, and from that turning up to the south, where

the basin's drainage stream comes down. I have no doubt this was often done by sheepmen. But it is a dreadfully roundabout, difficult, long way. Moreover, the trail that leads down into Paradise Valley is almost impassable now, and by the time the sheepmen have ceased for a year or two to use it, it will practically cease to exist. Trails of this sort have never been monumented, and a few seasons will see them overgrown, washed out — in fact, lost. This is a matter the Sierra Club should promptly and effectively interest itself in. Next season should be entirely devoted to *trail-marking*.

All the altitudes herewith reported are simply my estimate. Mt. Rixford, however, must be excepted. I found Dr. Rixford's record on that, and the height was therein given as 13,500 feet.

KING'S RIVER CAÑON TRAIL NOTES.

BY VERNON L. KELLOGG.

The Grand Cañon of the South Fork of the King's River will certainly be visited by increasing numbers of mountain-lovers. From a headquarters camp in the cañon the peaks of the King's-Kern Divide (Junction, Stanford, Crag Ericsson, No. 4, Brewer), the great triumvirate, Williamson, Barnard, and Tyndall, in the Main Crest just south of the Divide, the peaks of the Main Crest from Junction north to the Palisades (Keith, Bradley, University of California, Kearsarge, etc.), Mts. Gardner and King, Bolton Basin, and all the interesting mountains and gorges whose waters flow into Paradise Cañon and Bubb's Creek, are readily accessible. With the new trail, much shorter than the old, now being made by Forest Ranger Kanawyer from Millwood to the cañon, the region is made more easily, at least more quickly, accessible from the outside than it has been heretofore. Mr. Kanawyer will also keep provisions and camp supplies for sale in the cañon. With this probable increased visitation of the cañon in mind, I have written out the following brief account of the course, character, and lengths of some of the trails of this region. The notes may help the new-comer in planning his excursions.

First, as to getting in to the cañon itself. One goes by rail to Fresno or Sanger, by stage a long day (or better, a night, to escape the heat of the valley and foothills: Gallagher and Deneen, address Sanger, will take you, if you are a "stageful," through by night) to Millwood, or, when the new trail is completed, to Long Meadow, and thence

by pack-train into the cañon. The old trail has been described several times in the BULLETIN. The distances between camping-places and special landmarks on it are given (in hours) exactly by Mr. Lincoln Hutchinson in the BULLETIN (Vol. II., p. 111). To traverse this trail from Millwood to your definitive camp in the cañon requires, for the ordinary party, two days and a half (two nights' camping on the trail). Coming out from the cañon the trip is made in two days (one night's camping on the trail). By the new trail it is expected that a party can leave the cabin "hotel" at Long Meadow rather early in the morning, lunch in Big Boulder Cañon, and reach the King's River Cañon by night of the same day. The King's River will be reached, however, several miles lower down than now reached by the old trail, and it will require the following forenoon to get up to a place in the cañon desirable for headquarters camp. The new trail keeps much closer to the King's River than the old; gives, in fact, intermittent views of the river and cañon all the way in. It ought to be an exceedingly picturesque way.

The cañon can, of course, be reached from other points. From Visalia, for example, one follows a wagon road to Big Meadows, and thence by a trail to Horse-Corral Meadows, where the old Millwood trail is joined.

Once in the Grand Cañon, the best place for a headquarters camp is on the north side of the river somewhere near the mouth of Copper Creek. Mr. J. N. Le Conte camps near the mouth of Granite Creek, a mile down the river from Copper Creek. Professor Brown camps near the confluence of Paradise Cañon and Bubb's Creek, a mile or more above the mouth of Copper Creek. There is feed for animals between the mouths of Copper and Granite creeks, and also at the confluence of Paradise and Bubb's.

In giving the lengths of the trails in the neighboring region, I shall take the mouth of Copper Creek as a point

of departure. For a guide to the region Mr. Le Conte's sketch-map of Bubb's Creek Basin published in the BULLETIN (Vol. II., No. 2), is the best you can get. As all the important topographical features of the region and the courses of the trails are plainly shown on this map, I shall only undertake in the following notes to give the lengths or distances in terms of time and a few statements as to the character and condition (difficulty or ease, availability or non-availability for animals, etc.) of the trails. It is needless to say that a trail's length, in time, varies with the tramper and climber. The times given are ordinary times.

Copper Creek to Fox's Bridge.—An easy trail, or rather two easy level trails, one on each side of the river, perfectly distinct, following down the river past the mouth of Roaring River (to visit Roaring River Falls take the trail on south bank). Animals. To get to south bank of river, cross on log-jam between mouths of Copper and Granite creeks, or cross on foot-log a little above mouth of Granite Creek. Ford a little above foot-log. Two hours; to Roaring River Falls, one and a quarter hours.

Copper Creek to beginning of Paradise Cañon.—Easy level trail up the river on north bank. Animals. Forty minutes. To beautiful falls in Paradise Cañon follow distinct trail up west bank of Paradise. Animals. Short distance. [Met grizzly once near falls!]

Copper Creek to top of Grand Sentinel.—Down King's River to foot-log; cross to south bank; up (east) south bank a few rods to fence, where find dim trail to south through bushes (trail necessary here) into Avalanche Cañon. Then up Avalanche; steep, faint trail; keep mostly to bed of stream or near it (at first no water, later too much); (trail not so necessary); leave cañon to left just beyond large smooth rock-face by single conspicuous weather-beaten

tree (two or three hours from beginning of trail); follow up gully, steep, no trail, no water, or but trace, gully fading out to summit 3,480 feet above floor of cañon; the whole ascent three to four hours; steep and tiring, but not otherwise difficult; not dangerous; guard against loose stones in Avalanche Cañon, also loose rattlesnakes! No water to drink (carry canteen) after leaving Avalanche Cañon. View of the Grand Cañon and Bubb's Creek the best obtainable; good view of Mt. Brewer and University of California Peak.

Copper Creek to Goat Mountain.—Goat Mountain is a good "first mountain" to climb from the cañon. It is an excellent point of orientation, standing as it does out of the Main Crest, and high enough to include a fine sketch of it in its panorama. Trail is the regular Granite Basin trail, running north from mouth of Copper Creek on west side of Copper Creek for about two hours; steep at first; crosses Copper Creek at spring (Wood's sheep corral); follow till small flattish cairn of eight or nine stones on larger rock is reached; here take the right branch of trail, rather faint, till convenient crossing-place (first group of pine trees on bank of stream) on stream to the right is found; cross to right (from now on no regular trail, occasional sheep-paths); zigzag up steep, scrub-covered hillside; work down, keeping rather to left, to dry gully, cross and up to summit of little ridge; keep north along center of this ridge until at very foot of the shoulder of Goat Mountain (the mountain directly in front to north), and work to right among stones over ridge, and camp (near timber-line) in low pines near little streamlet; small ponds just above, and large meadow for animals some distance below. This spot is about four hours from mouth of Copper Creek. Fine view from this camp of Paradise Cañon region, Mts. Gardner, King, and Brewer. Summit of Goat Mountain 12,500 feet; can be

easily reached in two hours or less. From Goat Mountain camp to mouth of Copper Creek about two and a half hours. The whole trip can be made in one day, but hard; better take a day and a half. Trail all easy, a little troublesome picking out way after leaving trail. Animals may be readily taken to timber-line camp. Ascent of summit from timber-line camp perfectly easy. (See bearings of peaks in panorama at end of article.)

Copper Creek to Lake Charlotte and Bullfrog Lake.—Regular trail from cañon over Kearsarge Pass to Independence. Animals. From mouth of Copper Creek follow up north bank King's River to ford and log jam across Paradise Creek (forty minutes); cross, turn to right and climb steep but short hill into Bubb's Creek Cañon; follow up Bubb's Creek on north bank, reach mouth of Rhoda Creek (about three and a half hours); here either turn to left, keep along west bank of Rhoda Creek, climbing steeply, then following up Rhoda Creek on north bank to Lake Charlotte, and on to Lower Bullfrog Lake; or cross Rhoda Creek near mouth, keep up Bubb's Creek (north bank) to where trail turning to left climbs steeply up to Lower Bullfrog Lake. By either trail it is a day's journey from mouth of Copper to Lower Bullfrog. Trail all fair, and always distinct, good grazing for animals; sometimes rather closely eaten. Make this headquarters camp for climbing University of California Peak, Mt. Rixford, etc.

Bullfrog Lake to Kearsarge Pass.—Plain, easy, well-worn trail (animals) on north bank east to Pass. About one hour. From Pass easy climb to summit of Mt. Gould (13,391 feet), one hour and a half. Mt. Gould is the first point or peak in the Crest north of the Pass.

Bullfrog Lake to University of California Peak.—No trail. Set out directly toward peak, following string of lakes

which leads into northwest basin of peak; Kearsarge Pinnacles, sharp, ragged ridge, on right. Climb this ridge to right about even with last lake in basin, coming out on western slope of mountain; work up, keeping to right (south and east), and make last climb over rough rocks on south face, in fact a little east of south. Last stretch a little difficult. Time from Bullfrog Lake about three and a half hours. Panorama fine; the tremendous sheer drop into Owen's Valley impressive; best point to view the great valley stretching north and southeast of Main Crest and the mountains far to east.

Bullfrog Lake to Mt. Rixford.—No trail. Begin climbing immediately to north of the lake; into basin (Rixford Bowl); to right (east) to ridge, and along ridge (north) to summit (13,300 feet?); about two hours. Fine view of Bolton Basin immediately below to north; also of head of South Fork. Fine view of Main Crest from Palisades south to Junction Peak. Mt. Whitney also visible. In descending take slide of loose stuff at left (east) of first saddle under the summit into the gorge of Colored Peak (next peak to east), and follow streamlet. Descent less than one hour. Good sport! Mt. Rixford is indicated on Le Conte's map (BULLETIN, Vol. II, No. 2,) as unnamed mountain immediately to west of Colored Peak. (See bearings of points in panorama at end of article.)

Copper Creek to East Lake.—Follow Bubb's Creek trail as described in "*Copper Creek to Bullfrog Lake*" to mouth of South Fork of Bubb's Creek. Here find branch to right, cross Bubb's Creek, ford and fallen logs just below, and follow up South Fork on west bank; trail plain for a while, but rather hard to follow after getting on rocks; many little cairns (too many, trail too diffuse); trail keeps rather away from stream bank; distance from mouth of South Fork to East Lake, one and a half to two hours; lose time on

account of diffuse trail; trail some places rather uneven for animals, though not really bad. From Copper Creek to East Lake an easy day's journey, with long lunch stop and early night camp. Camp on west side of East Lake near mouth of Ouzel Creek. (See President Jordan's sketch map of East Lake region in BULLETIN, Vol. III., No. 1.) Fine grazing for animals on shore of lake. Make this headquarters camp for climbing Mt. Brewer and Stanford University Peak.

Bullfrog Lake to East Lake.—After "doing" Kearsarge Pass region, one can begin exploring the Brewer-Stanford region without returning to headquarters camp in the cañon, by going from Bullfrog Lake down into Bubb's Creek, follow down it (west) to mouth of South Fork and up (south) South Fork to East Lake. Time, three and a half to four hours.

East Lake to Mt. Brewer.—From camp at mouth of Ouzel Creek take smooth rock (no trail) between Ouzel Creek and Barbara Brook, and make for ridge projecting east from main peak of Brewer (central one of the three peaks visible looking west as you begin the climb). Get on the ridge and follow to summit (13,886 feet); easy ascent. Time three hours or less from East Lake camp. (See trail marked on Jordan's map of East basin of Brewer, BULLETIN, Vol. III., No. 1.) Panorama from summit fine.

East Lake to Harrison's Pass and Stanford University Peak.—No trail (occasional traces of old sheep-trail to Harrison's Pass). From camp near mouth of Ouzel Creek go south along lake to southern shore, cross stream coming into lake from south from west to east on sheep bridge near the lake; to right through willows, and work up slope to left through trees bearing rather to right to little lake just north of Castilleja Lake; follow up (east) stream from this

lake, keeping near water (fine turf footing) to lake; take right-hand bank of this lake, and left-hand of succeeding lakes until the last (in Stanford Basin); go to right of this, follow up gully with large broken rock, and climb steep loose slide to Harrison's Pass (the right-hand slide, the one with lowest summit, the one first east of Crag Ericsson, the great crag at right); note zigzag foot-trail up this slide; from Harrison's Pass keep to left over large broken rock to summit of Stanford; first summit is Gregory's Monument (cairn with club cylinder), second is the higher, and is Stanford. Time to Harrison's Pass about three hours, to summit of Stanford about four and one half hours. Descent from summit of Stanford to East Lake camp, about two and one half hours. In no place difficult or dangerous, unless between Gregory's Monument and Stanford. Panorama from Stanford magnificent. To south is Kern River Cañon, with the great Western Divide (Table, Milestone, and Kaweahs) on its right, and Main Crest (Williamson, Barnard, Tyndall, and Whitney) on its left; view of Junction, Keith, Bradley, and University of California Peak in Main Crest to east and north fine. The great basins to west and east of Stanford impressive. For points in immediate vicinity of Stanford see Jordan's sketch-map of East Basin of Brewer, already referred to, and Bradley's map of East Creek Amphitheater (BULLETIN, Vol. II., No. 5). (See bearings of points in panorama at end of article.)

For accounts of the way from *East Lake over the Kings-Kern Divide to Mt. Williamson*, see Professor Brown's paper "Wanderings in the High Sierra, between Mt. King and Mt. Williamson," (BULLETIN, Vol. II., No. 1).

For account of trail from mouth of *Copper Creek to Tehipite Cañon* (Middle Fork of King's River), see paper by Professor Stillman "To Tehipite Valley from King's River Grand Cañon," (BULLETIN, Vol. II., No. 1).

For the sake of aiding any one climbing for the first time in the King's River Cañon region in getting acquainted with the various peaks of the region I append my compass readings (corrected for magnetic variation; local variation something startling) from the summits of three well-separated peaks, viz: Goat, Rixford, and Stanford:—

From Goat Mt.

Mt. Goddard, N.
 Mt. Woodworth, 10° E. of N.
 Striped Mt., 60° E. of N.
 Mt. King, 126° E. of N.
 Mt. Rixford, 132° E. of N.
 Mt. Gardner, 138° E. of N.
 Univ. of Calif. Pk., 140° E. of N.
 Mt. Williamson, 146° E. of N.
 Stanford Univ. Pk., 150° E. of N.
 Mt. Whitney, 154° E. of N.
 Crag Ericsson, 155° E. of N.
 Mt. Brewer, 166° E. of N.
 Kaweah Peak, 184° E. of N.
 Avalanche Pk., 186° E. of N.
 Grand Sentinel, 194° E. of N.
 Granite Basin, W.

From Mt. Rixford.

Mt. Gould, 80° E. of N.
 Kearsarge Pass, 94° E. of N.
 Univ. of Calif. Pk., 112° E. of N.
 Mt. Keith, 130° E. of N.
 Mt. Whitney, 134° E. of N.
 Mt. Tyndall, 134° E. of N.
 Junction Peak, 142° E. of N.
 Milestone Pk., 176° E. of N.
 No. 4, 180° E. of N.
 Mt. Brewer, 206° E. of N.
 Avalanche Pk., 228° E. of N.
 Rhoda Dome, 245° E. of N.
 Mt. Gardner, 270° E. of N.
 Mt. King, 300° E. of N.
 Mt. Goddard, 316° E. of N.
 Pivot Crag, 318° E. of N.
 So. Palisades, 340° E. of N.

From Gregory's Monument.

Univ. of Calif. Pk., 26° E. of N.
 Mt. Bradley, 58° E. of N.
 Mt. Keith, 90° E. of N.
 Junction Pk., 108° E. of N.
 Mt. Williamson, 126° E. of N.
 Mt. Whitney, 148° E. of N.
 Kaweah Pk., 194° E. of N.
 Milestone Pk., 230° E. of N.
 No. 4, 232° E. of N.
 Mt. Brewer, 266° E. of N.
 Cross Mt., 284° E. of N.
 Rhoda Dome, 316° E. of N.
 Mt. Gardner, 332° E. of N.
 Mt. King, 346° E. of N.
 Mt. Jordan, 350° E. of N.

THE ASCENT OF "MATTERHORN PEAK."

BY LINCOLN HUTCHINSON.

Late in the afternoon, on the 24th of last July, four very tired men and three equally weary burros pitched camp on Rancheria Creek, at a point just north of Piute Mountain. The spot was a charming one; high rugged bluffs rising on either side, culminating in majestic granite walls and crags which caught the glow of the setting sun, while down the stream to the southwest stretched a dreamy vista of forest-covered cañon. We noted, half unconsciously, the beauty of the scene, though we were far too weary to be deeply impressed by it at the moment. Our party, consisting of Messrs. C. A. Noble, M. R. Dempster, J. S. Hutchinson, Jr., and the writer, had left Sonora nine days before with the intention of making our way via Lake Eleanor to Tiltill Valley; thence over the little-explored region to the northeastward to Matterhorn Peak. Progress had been fairly rapid and free from difficulties till after we left Tiltill, but there had then followed three days of desperately hard work. The day before this one on which we pitched camp on Rancheria Creek, twelve hours of heroic toil from early dawn till nearly dusk had netted us less than one mile and a half as the crow flies; and this very day itself had added not more than six or seven miles to our record. So that now, in addition to our weariness, we were beset by the growing conviction that at the present slow rate of progress, it would be impossible to carry out the trip as we had originally planned it. Our whole outing was strictly limited as to time; we must, without fail, be back in Sonora on such

and such a day; and it was beginning to look as though we should be obliged to turn homeward without having so much as set eyes upon the Matterhorn.

Moreover, there was a strong probability that the difficulties, instead of lessening, would increase as we advanced. Up to this point we had been in a region covered by the United States Geological Survey maps, and these, in spite of the fact that they contained some serious and inexcusable blunders, had been an invaluable aid to us. But to-morrow we should not only pass into a new region, described by Lieutenant McClure as excessively wild and rough, and abounding in almost insurmountable difficulties, but we should be obliged to depend on maps which made no pretense of being as reliable as those published by the Government.

In spite of hard work, the trip up to this point had been a most successful one,— abundance of fresh air and wholesome exercise, a succession of most charming scenes and new experiences, and, above all, a series of the most delightful and picturesque camping-places. We discussed the question in all its details, made new estimates of our stock of provisions, and ere we betook ourselves to the shelter of our sleeping-bags, had determined to push forward for still another day, and then if the outlook did not seem more promising to turn our faces homeward.

The next day brought a pleasant surprise. The difficulties which Lieutenant McClure's description of his exploration led us to suppose lay before us proved to be a mere *bagatelle* when compared to what we had been passing through. The distances were less than indicated on the map, and the route, though rough in places, was neither excessively difficult nor at all dangerous, and before nightfall we were rejoicing in the certainty that the fears of the previous day had been unfounded.

Mid-afternoon of the second day found us pitching camp



Stubblefield Cañon. ↓

↓ Thompson Cañon.

Rancheria Cañon. ↓

STUBBLEFIELD, THOMPSON, AND RANCHERIA CAÑONS—LOOKING NORTHEAST.

Photograph by J. S. Hutchinson, Jr.



on the head-waters of Matterhorn Creek, at an elevation of about eleven thousand feet, close to the base of the peak which was our objective point. The remainder of the afternoon was spent in resting preparatory to the morrow's climb, and in discussing a new problem which now confronted us. Rising above our camp a mile to the northwest, and separate from the main ridge of the Sierra, was a sharp peak, which on Lieutenant McClure's map and in his articles in the *SIERRA CLUB BULLETIN* is called Matterhorn Peak; while towering above us to the northeast, and forming part of the main crest, was another much higher peak, which on the Sierra Club map bears the same name. Which of these two was the real Matterhorn?—which should we attack on the morrow? Neither of them bore any marked resemblance to the true Matterhorn of Switzerland, and their appearance therefore gave no clew as to which was the one we had come so far to conquer. After a long council of war, our decision was made. We had come for glory; our attack should be directed against the peak which was highest and apparently the most difficult of ascent. What's in a name? Matterhorn or not, the peak in the main ridge was the one for us to scale. The decision made, we crawled into our sleeping-bags, mused a while as we gazed upward into the cold, dark, star-besprinkled sky, and dropped away into dreamland thinking of the many terrors inseparably coupled with the dread name of Matterhorn.

The gray dawn found us equipped with rope, ice-ax, and cameras, groping our way upward over confused talus slopes toward a saddle in the ridge which extended southward from the peak. Skirting a small glacier which lay directly south of our objective point, we passed across the ridge and turned northward directly toward the summit. The climb was a hard one, but it could not be called extremely difficult nor at all dangerous for any one reasonably

cautious and at all accustomed to climbing. We found no occasion to use either rope or ax.

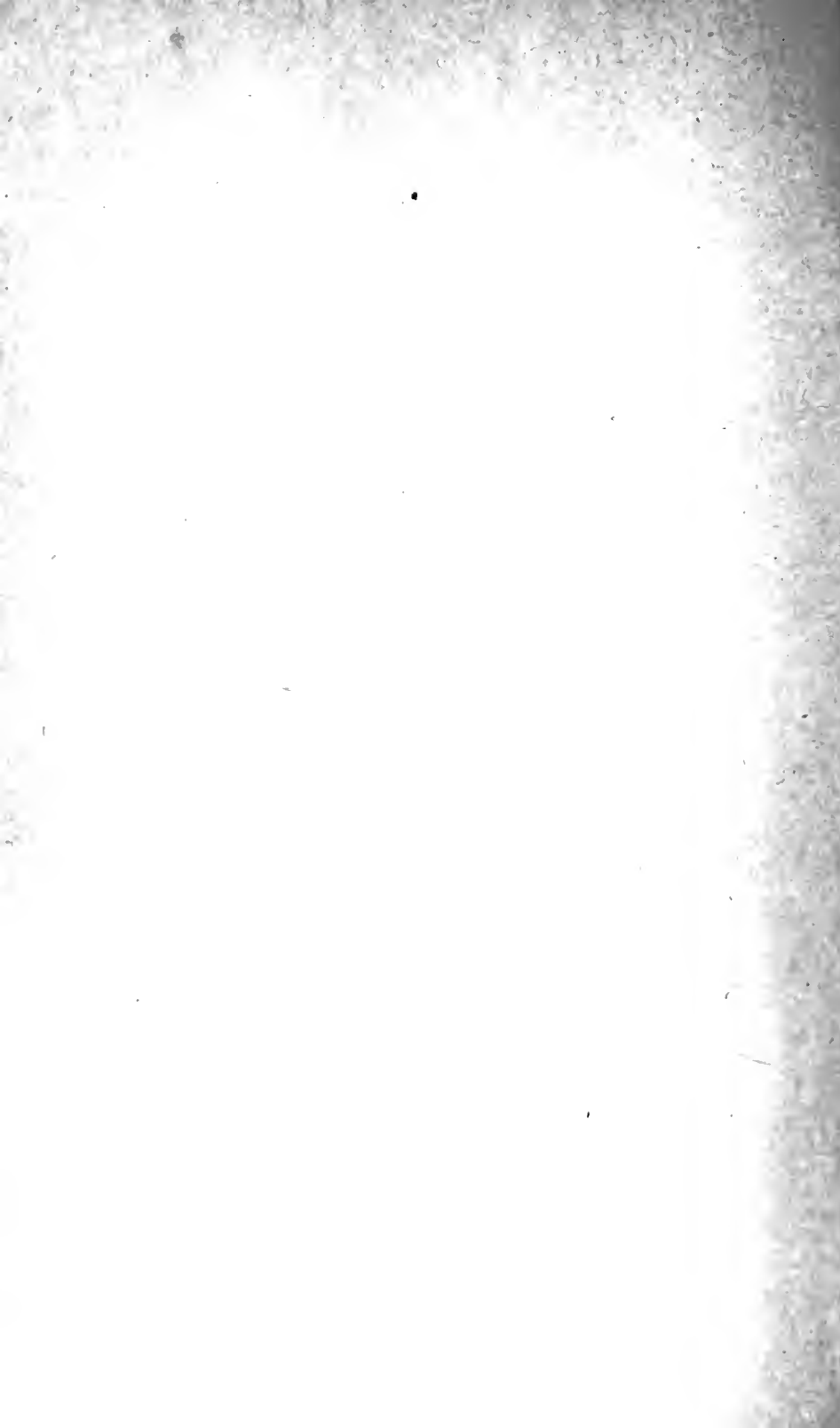
The summit, which is a great jagged tooth in what is known as the Sawtooth Ridge, was reached in something less than three hours from camp. The day was a beautiful one and the view inspiring. Directly north, close at hand, were the weird crags of the Sawtooth Ridge; to the east lay the barren volcanic wilderness which nearly everywhere characterizes the eastern slope of the Sierra; to the west, the vast confused network of crags and cañons, with black forest slopes beyond. But the view to the south was the grandest and most beautiful part of the panorama; the great bold mountain masses of the Conness and the Lyell groups—broad, bold strokes in blue and white on the wonderful canvas of nature. The intense exhilaration of the climb, the noble grandeur of the scene, and the wild exultation of standing on a spot which, so far as we were able to judge, had never before felt the pressure of human foot, combined to make up an experience never to be forgotten. We lingered long, drinking in the beauty of the scene, and then, after building a monument in which we left a Sierra Club Register, reluctantly made our way back to camp.

Our homeward journey was made without special difficulty or incident worthy of particular note. We followed, in the main, Lieutenant McClure's route as far as Conness Creek, then turned down that stream to the Tuolumne River, which we forded below Tuolumne Falls. Then crossing the ridge to Cathedral Creek, we ascended the latter to the Tioga Road.

Since reaching home we have learned definitely that the peak we ascended was the Matterhorn, having been named as far back as the time of the Wheeler Survey in 1878, and that Lieutenant McClure was therefore mistaken in applying the name to the lower peak to the west. That



SUMMIT OF MATTERHORN PEAK.



the name is a poor one there can be no doubt, for, as I have already said, there is only the barest suggestion of resemblance to the wonderful Swiss mountain after which it is called. Yet the name is of so long standing that it seems hardly best to think of making any change.

Aside from the slight disappointment in the character of the peak which we had set out to climb, the whole trip was a most successful one. Probably nearly all members of the Sierra Club are familiar with the beauties of the Lake Eleanor and Lake Vernon regions. Beyond there the country increases in ruggedness and grandeur, and from first to last we found a succession of beautiful and imposing scenes.

I cannot close without a word in regard to the work of the Yosemite Park patrol. Going as we did into the most remote corners of the park, and in a year when the troops were mostly engaged elsewhere, we could not but have some misgivings as to the possibility, or even the probability, of finding evidence of the havoc wrought by the sheepmen. It was an agreeable surprise, therefore, to find only the very slightest traces of the presence of sheep. The meadows are green and luxuriant, the exquisite mountain flowers are blooming in profusion, and whole forests of tiny new conifers are springing up in spots which for years have been bare. To those familiar with the mountains this new growth must speak volumes in favor of national control of the park.

SIERRA CLUB BULLETIN.

PUBLISHED IN JANUARY AND MAY OF EACH YEAR.

Published for Members.

Annual Dues, \$3.00.

The purposes of the Club are:—"To explore, enjoy, and render accessible the mountain regions of the Pacific Coast; to publish authentic information concerning them; to enlist the support and co-operation of the people and the Government in preserving the forests and other natural features of the Sierra Nevada Mountains."

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SECRETARY'S REPORT.

 FROM MAY 1, 1899, TO MAY 5, 1900.

The past year, from a financial standpoint, and respecting the Club membership, has been one of the most prosperous during the history of the Sierra Club. There have been one hundred and sixty-eight accessions to the membership, while the losses by death and resignations have amounted to but eleven. The Club is entirely out of debt, and has on hand a considerable balance with which to carry on its work.

The Yosemite quarters will this year be in charge of the experienced mountaineer and courteous ex-guardian of Yosemite Valley, Mr. Galen Clark, and it is expected that they will prove unusually attractive and of great service to visitors.

At the meeting of the Directors, held May 5, 1900, Mr. Robert M. Price presented his resignation as Secretary and as a Director of the Club. This was accepted, and Mr. William E. Colby was elected to fill the vacancy, both as Director and as Secretary.

FINANCIAL STATEMENT.

Cash on hand May 1, 1899	\$ 4 20
Collected for dues	1,564 50*
Received from sale of publications	55 26
Received on account of Yosemite quarters	9 50
Total	<u>\$1,633 46</u>
Deposited to account of Treasurer	<u>\$1,633 46</u>

Respectfully submitted,

ROBERT M. PRICE,
Secretary.

* This amount includes a portion of the dues for the year April, 1900, to April, 1901.

TREASURER'S REPORT.

FROM MAY 10, 1899, TO MAY 5, 1900.

RECEIPTS.

Cash on hand May 10, 1899	\$ 46 05
Total cash received from Secretary	1,633 46
	<u>\$1,679 51</u>

EXPENDITURES.

Publications	\$ 528 84
Printing of circulars, notices, etc.	75 90
Postage and stationery	194 87
Room rent (13 months)	65 00
Clerical work and typewriting	190 00
Binding	12 50
Registers and register boxes	38 95
Public meetings	21 20
Yosemite headquarters	70 90
Incidentals	48 91
Balance on hand	432 44
	<u>\$1,679 51</u>

(NOTE—In the above report a portion of the dues of the present year are included.)

Respectfully submitted,

J. N. LE CONTE,
Treasurer.

NOTES AND CORRESPONDENCE.

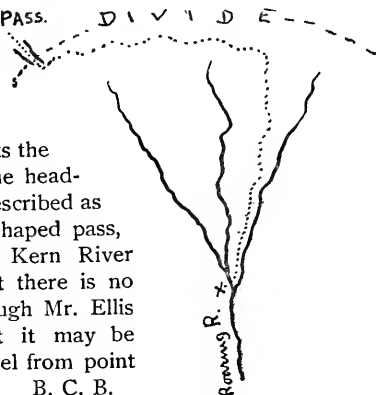
In addition to longer articles suitable for the body of the magazine, the editor would be glad to receive brief memoranda of all noteworthy trips or explorations, together with brief comment and suggestion on any topics of general interest to the Club.

The office of the Sierra Club is at Room 45, Merchants' Exchange Building, San Francisco, where all the maps, photographs, and other records of the Club are kept.

There are but a few copies on file of No. 3, Vol. I., of the BULLETIN. The Club would like to purchase additional copies of that number, and we hope any member having extra copies will send them to the Secretary.

Mr. Ellis, forest ranger, **PASS.** described to me last summer, and gave me permission to publish it, a pass he has discovered that will fill a long-felt want. It connects the Roaring River Basin with the headwaters of the Kern. It is described as an entirely practicable V-shaped pass, this trough being on the Kern River side of the divide. As yet there is no monumented trail to it, though Mr. Ellis intends to make one; but it may be reached in half a day's travel from point X on the map.

B. C. B.



BOLTON BASIN AND MT. RIXFORD.

There should have been explained, earlier than this, to the Sierra Club the use of the names "Bolton Basin" and "Mt. Rixford" in articles by President D. S. Jordan in the "Land of Sunshine" and "Sunset," and by myself in "Sunset," descriptive of the King's River Cañon. This explanation is rendered imperative now by reason of the appearance in this number of the BULLETIN of an account of Bolton Basin by Professor Brown.

As Professor Brown was leaving the cañon last summer he told

me about a "splendid lake basin" lying to the north of the Charlotte-Bullfrog Lakes basin which he and Mrs. Brown had partially explored. He urged our party (a group of Stanford men and women, including President Jordan and wife, Professor Cubberly and wife, Professors Richardson, Marx, Swain, Associate Librarian Babine, Mr. Irving Squire, of Toledo, Ohio, and the writer) to continue the exploration of the basin. During the course of the summer we made sketch-maps of the basin, indicating the position, shape, and size of the lakes in it, from various points on the high east-and-west ridge, running from the first peak in the Main Crest north of Kearsarge Pass to Mt. Gardner, and Messrs. Swain and Squire went into the basin over the ridge, traversed it, and left it by its northern end which drops into a wild, deep gorge of one of the confluent of the South Fork of the King's. These gentlemen carried a camera and got a half-dozen or more good views of various parts of the basin.

The basin lies between the west wall of the Main Crest (north of Kearsarge Pass) and the east wall of the north-and-south ridge, comprising Mt. Gardner, Split Mountain, and Mt. King. It is bounded on the south by the Kearsarge Pass - Mt. Gardner east-and-west divide, and on the north by the deep gorge of a branch of the South Fork of the King's River. It contains twenty-seven (or more) lakes, is traversed by a north-and-south-running low ridge, in the middle of which rises a splendid pinnacle, or crag, apparently inaccessible. The part of the basin lying west of this central ridge has a higher floor than the eastern half. The basin drains into the northern gorge.

This beautiful and interesting basin deserves a name, and we dubbed it "Bolton Basin," for honor of that true mountain-lover and indomitable mountain-climber, Professor Bolton C. Brown. The largest lake in the basin, lying just at the eastern base of the central crag, we call "Lake Lucy," for Lucy Fletcher Brown. The central crag we call "Pivot Crag."

The highest point in the Gardner-Kearsarge Divide is a peak just at the south end of the median ridge of Bolton Basin. It is the best view-point for seeing Bolton Basin spread out below, and it offers a magnificent view of the whole King's River region, bounded on the south by the King's-Kern Divide and on the north by the Mt. Goddard region. It is far enough out from the Main Crest to allow the reach of the crest for miles north and south to be seen, and near enough to lose none of the eloquent details of its sculpturing. It is approximately 13,300 feet high, and is worthy of a name. On climbing this peak I found records of but two previous ascents (not that the climbing is at all difficult; it is of the easiest), the first in time being that of Dr Emmet Rixford.

Dr. Rixford's name became especially familiar to us last summer through finding it at the top of almost every peak we got up. On Mt. Stanford, Brewer, University of California, and elsewhere, the records revealed the activity of this climber. At my suggestion we have called the hitherto unnamed peak in the Gardner-Kearsarge Divide "Mt. Rixford." A record of the naming (not a club cylinder) with a tolerably complete list (including two dozen peaks) of compass readings of the peaks of the panorama was left in a cairn. Lower Bullfrog Lake and No. 4 of the Kings-Kern Divide are due south, Mt. Gardner is due west, and Kearsarge Pass is a very little south of east. Mt. Rixford is easily climbed from Lower Bullfrog Lake. In ascending keep to the rocks; in descending take the slides of loose stuff. The coming down can be right speedy.

VERNON L. KELLOGG.

CUT-OFFS ALONG THE HOCKETT TRAIL.

The unsavory reputation of Harrison's Pass, and the unexpected grandeur of the mountain appetite which demands recoaling, and the desire to see the edge of the desert lead many tourists every season to go down through Lone Pine and Independence instead of attempting a direct passage between Bubb's Creek and Mt. Whitney. The mapped trail by the tunnel forks is a long detour, which may be partly obviated by crossing directly from Mulkey Meadow to Whitney Creek; but there is a very easy trail that is still shorter. It is from Horseshoe Meadows, as the map names it, which is generally known in the vicinity as Round Valley, or Round Meadow. When you enter the meadow from the Lone Pine side, by either trail, several gaps in the mountains are in sight. One of the lowest, and the most traveled, is exactly west by the compass from the north edge of the meadow. There is no distinct trail at first. Strike out straight for the gap and you will come next to the farthest north of the little creeks which water the meadow. Keep on the north side of this creek and you will soon be in a well-worn trail, by which it is not three hours from this meadow to the main trail on the west side of Whitney Meadows. Getting at it from the other side, the pass may be located from the corral, whence it is 55° E. of N. The trail is at first on the south side of the creek which it ascends.

From Round Valley down to where it leaves the Little Cottonwood the old Hockett Trail is almost untraveled. The shorter route now in use leaves the valley at the lower end, drops over to the Big Cottonwood, descends this past an old sawmill, and crosses

to the Little Cottonwood, which it reaches about fifty yards below where it rejoins the old trail, at the foot of the Devil's Ladder.

Another trail in recent use is between Mineral King and the Big Kern, via Coyote (or Quinn's) Pass. I think they are the same. From the east it starts at the soda spring and keeps north of Coyote Creek up to the meadows. From the west it leaves the Hockett Trail, perhaps two miles south of Farewell Gap, and is indicated by a signboard—"Poison Meadow Trail." According to the signs, the "Hockett Trail" leads to Mineral King, and the trail to Hockett Meadows is the "Hockett Meadow Trail." E. B. C.

A NEW TRAIL TO THE GIANT FOREST.

It may be of interest to the members of the SIERRA CLUB to know that a new route has been opened to the Giant Forest in the Sequoia National Park, connecting Mineral King with the Colony Mills Road. The writer, with a party, was the first to travel over it during the month of July, 1899.

Having ascended Mt. Whitney, we passed down the Kern River, over Farewell Gap to Mineral King, and at the Soldiers' Camp, some four miles down the road, obtained our permit to enter the Park. Leaving Mineral King at 11:30 A.M., we followed the old trail to the north over Timber Gap, thence down Deer Cañon and across Cliff Creek to Redwood Meadows, arriving there at 3 P.M., and making camp for the night. Here is a fenced pasture containing very fine feed, but no water, except such as could be obtained from a shallow well dug in the edge of the meadow, south of the old barn.

Leaving the meadows at 8 A.M. the next day, we followed the trail across Granite Creek and the Middle Fork of the Kaweah, thence along a side-hill on the north of the latter stream, until we reached what is known as Bear Paw Meadow, almost on the divide between the Middle Fork of the Kaweah and Buck Cañon. To this point we had been following an old cattle-trail which proceeds farther along the ridge to Lone Pine Meadow, near the head of Middle Fork. It is from just above Bear Paw Meadow that the new trail has been made to the Merton Meadows that lie nearly at the top of the ridge, between the Middle Fork and Marble Fork of the Kaweah River. These Merton Meadows are also known as Alta Meadows and Farley Meadows.

Leaving Bear Paw Meadow the trail passes north over the ridge, then turning to the west proceeds down a narrow swale or glade for about three hundred yards, and then turns down-hill into Buck

Cañon. Crossing this cañon it starts immediately up the north side, and, after climbing the long hill, comes out on a rocky plateau close to the ridge and about half a mile east of the most easterly of the Merton Meadows. Here the trail turns to the west, crosses these meadows, thence along the side-hill to where it connects with the old trail to Giant Forest, heretofore used by the U. S. troops, and known as the Castle Rocks Trail, the point of junction being at the head of the "Seven-Mile Hill." Here you are in the park, and can follow the trail down the hill to the northwest into the watershed of the Marble Fork.

The connection between Bear Paw Meadow and Merton Meadows crossing Buck Cañon was made in July of this year by Mr. Ernest Britton, U. S. forest ranger, as a means of covering the territory under his supervision in a much better manner than was possible when the Castle Rock trail was the only means of entry into the country lying between Middle Fork and Marble Fork. At the time we went over it, little had been done except to indicate the route to be followed, yet no difficulty was experienced in riding the entire distance accompanied by loaded pack-animals. With a small amount of money spent upon the trail, it would open up a short, easy, and picturesque means of communication between Mineral King and the Giant Forest. Apparently the forest is but very seldom visited, as on none of the trails were there indications of any one having been in this year prior to our reaching there on July 24th.

The grass on all the meadows was very luxuriant, and the trout in the Marble Fork were abundant and of fine quality.

The time spent in traveling between Mineral King and the Giant Forest is as follows:—

	hrs.	min.
Mineral King to Redwood Meadows	3	30
Redwood Meadows to Bear Paw Meadows	2	10
Bear Paw Meadows to Buck Cañon Creek		45
Buck Cañon Creek to East Merton Meadows	2	50
East Merton Meadows to head of Seven-Mile Hill		45
Seven-Mile Hill to Round Meadow Camp in Giant Forest .	3	.
	—	—
Total number hours' travel	13	.

H. H. SINCLAIR.

ASCENT OF JUNCTION PEAK.

Sierra Club Cylinder No. 36 was deposited on the summit of Junction Peak, August 8, 1899, by Mr. E. N. Henderson and myself. The peak is at the union of the King's-Kern Divide with the main axis of the Sierra. A smaller ridge runs through it, sloping away to the south (where we climbed it) in the Kern Basin, and ending in the other direction in the nearest mountain southwest of University Peak. The ascent was made from camp at the foot of East Lake, starting at 7 A.M. Before 10 we had climbed Harrison's Pass, and were on the south summit of Mt. Stanford. Thence we worked southeast over the spur that runs to No. 1, and down through a magnificent lake-dotted granite amphitheater, which we called "The Coliseum." Near the lower end of this we scaled its east wall, and turned north up a sandy plateau which is connected with the peak by an easy knife-edge. The peak itself, like Stanford and Crag Ericsson, is a high and less comfortable knife-edge. It tends west of north, and is slightly highest at the north point. The altitude is said to be 14,150 feet; it seems hardly so high. The day was clear except for scattering clouds in the north; the two preceding days it had snowed. Returning we took the same course, only skirting the base of Stanford, and felt our way into camp at 10 o'clock. Beside our route, the peak is accessible from the southeast, and probably from the King's-Kern Divide. The view cannot be rivaled by that from any neighboring mountain, including as it does the basins of the King's and Kern, with the Inyo Valley, the picture of depth, on the other side.

The panorama is (compass readings):—

N. 18° E.	Mt. Bradley.
N. 50° E.	Mt. Keith.
N. 117° E.	Mt. Williamson.
N. 130° E.	Mt. Barnard.
N. 135° E.	Mt. Tyndall.
N. 142° E.	Mt. Whitney.
N. 190-210° E.	The Kaweah Group.
N. 225° E.	The Milestone.
N. 235° E.	Table Mountain.
N. 252° E.	No. 1.
N. 260° E.	Mt. Brewer.
N. 268° E.	Crag Ericsson.
N. 286° E.	Mt. Stanford.
N. 315° E.	Mt. Gardner.
N. 335° E.	Mt. Goddard.

University Peak is a little west of north, but was hidden in a cloud.

The panorama from University Peak is:—

N.	Mt. Kearsarge.
N. 45° E.	Independence.
N. 110° E.	Owen's Lake, Mt. Bradley.
N. 132° E.	Mt. Williamson.
N. 140° E.	Mt. Keith.
N. 145° E.	Mt. Tyndall.
N. 165° E.	Junction Peak.
N. 190° E.	Mt. Stanford.
N. 198° E.	The Milestone.
N. 204° E.	Table Mountain.
N. 225° E.	Mt. Brewer.
N. 266° E.	Mt. Hutchings (?).
N. 285° E.	Mt. Gardner.
N. 305° E.	Mt. Goddard, Mt. King.
N. 325° E.	Mt. Jordan.

EDWIN BINGHAM COPELAND.

CAMP COMMISSARIAT.

As an answer to the repeated questions asked by those planning trips to the mountains, as to provisions and cooking outfit, frequent reference has been made to the excellent suggestions on this subject in two articles in the *SIERRA CLUB BULLETIN*, one by Mr. Longley and the other by Mr. Solomons. (See *BULLETIN*, Vol. II, pp. 29, 111.) On various trips made into the remote regions of the High Sierra by the writer and a party of three or four, most of the articles of food suggested by Mr. Longley and Mr. Solomons have been used, but in addition, we have also taken a number of other articles which, owing to their compact form, nutritious qualities, palatableness, ease and quickness of preparation, or the fact that they require no preparation, we believe to be a decided success.

The following is a list of our provisions. The first ten articles mentioned possess either all or most of the advantageous qualities referred to, and we can particularly recommend them for hard trips. The list contains sufficient food for five men for twenty days, or one hundred rations.

	QUANTITY.	LBS.	COST.
Knorr's soup tablets	12 $\frac{1}{4}$ lb. pkg.	3	\$1 00
Knorr's erbswurst or marrow pea soup	3 1 " "	3	60
Desiccated white potato . . . . .	.....	8	80
Evaporated sweet potato . . . . .	.....	5	1 00
"Julienne" . . . . .	.....	$\frac{1}{2}$	15
Grape nuts . . . . .	.....	3	45
Pinole . . . . .	.....	1	35
Shredded codfish	3 $\frac{1}{2}$ lb. tins	1 $\frac{1}{2}$	30
La Mont's improved crystallized egg	3 1 $\frac{1}{2}$ " "	4 $\frac{1}{2}$	2 95
Horlick's malted milk . . . . .	.....	3	2 25
Armour's sliced bacon	17 1 lb. tins	17	4 08
Armour's sliced ham	19 1 " "	19	4 56
Libby's boneless pigs' feet	4 1 " "	4	60
Libby's Vienna sausage	4 1 " "	4	60
R. & R. boned turkey	4 1 " "	4	1 80
R. & R. boned chicken	4 1 " "	4	1 80
Yacht club sardines	5 $\frac{1}{2}$ " "	2 $\frac{1}{2}$	1 00
Libby's corned beef	7 1 " "	7	84
Corned beef hash	1 2 " "	2	20
Beardsley's chipped beef	1 1 " "	1	25
Franco-American game patés	3 $\frac{1}{2}$ " "	1 $\frac{1}{2}$	1 20
Standard army emergency ration	2 2 " "	4	50
Kapp & Street's chicken tamales	3 $\frac{1}{2}$ " "	1 $\frac{1}{2}$	30
Smoked Hamburg eels	3 1 " "	3	75
Frame food stamina tablets	3 $\frac{1}{3}$ " "	1	75
Liebig's beef extract	5 4 oz. jars	1 $\frac{1}{4}$	3 50
Germea . . . . .	.....	3	18
Rolled oats . . . . .	.....	3	18
White flour . . . . .	.....	13	33
Whole wheat flour . . . . .	.....	7	18
Graham flour . . . . .	.....	10	30
Cornmeal . . . . .	.....	7 $\frac{1}{2}$	21
Pork and beans	3 1 $\frac{3}{4}$ lb. tins	5	53
Corn	2 1 $\frac{1}{2}$ " "	3	25
Tomatoes	2 2 $\frac{1}{4}$ " "	4 $\frac{1}{2}$	25
Crown raisins . . . . .	.....	5	35
Dried peaches . . . . .	.....	5	1 00
Dried apricots . . . . .	.....	1	18
Dried apples . . . . .	.....	2	30
Prunes (San Jose) . . . . .	.....	4	60
Prunes (Italian) . . . . .	.....	2	30
Baker's cocoa	2 1 lb. tins	2	1 00
Java-Mocha coffee . . . . .	.....	4 $\frac{1}{2}$	1 60
Hauswaldt's vigor chocolate . . . . .	.....	7	4 20
Cottolene . . . . .	.....	7	63
Rock candy drips	1 1 gal tin	10	50
Eagle condensed milk	11 1 $\frac{1}{4}$ lb. tins	14	1 60
Royal baking powder	2 $\frac{1}{2}$ " "	1	46
Whisky	7 pts.	7	4 00
Tea . . . . .	.....	$\frac{1}{2}$	35
Salt . . . . .	.....	7	15
Soda . . . . .	.....	1	10
Sugar (granulated) . . . . .	.....	18	1 17
Butter . . . . .	.....	4	1 00
Saccharine	100 $\frac{1}{4}$ -gr. tablets	....	50

The total weight of these one hundred rations is 267 pounds, or 2.67 pounds (42 oz.) per ration. This is about one third of a pound less than the ration of Mr. Solomons' list, the reduction in weight being largely due to the greater use of dried foods. It is about three ounces more than the United States Army Travel Ration. The cost is about fifty cents per ration.

Besides the articles mentioned in the above list, I would suggest *macaroni*, *spaghetti*, and *evaporated tomatoes*. They are light, easily carried, and can be made into a number of excellent dishes. *Wild onions*, which can be found in many places in the Sierra, also make an excellent addition to the meals.

Knorr's Soup Tablets—Afford a great variety in the way of soups. They are a very condensed form of food, each tablet, three inches square by half an inch thick, being sufficient for five plates of rich soup.

Knorr's Erbswurst, or *Marrow Pea Soup*—Put up in "cartridges" or cylinders ten inches long by two inches in diameter, is an excellent substitute for dried peas and beans, which are so difficult to cook in high altitudes.

Desiccated White Potato—Compact and light; cooks in five or six minutes; excellent for mashed potato and stews; a pleasant addition to many mixed dishes. We can recommend it very highly. It is much better than *evaporated* white potato, which is difficult to cook.

Evaporated Sweet Potato—Not quite so satisfactory as the white potato, as it must be soaked before cooking; is a valuable addition to the provisions.

"*Julienne*"—A mixture of various sorts of dried vegetables. The only objection to it is that it requires soaking and long cooking, but still is worth taking.

Grape Nuts—Can be served without any preparation; good for all meals.

Pinole—Needs no preparation; excellent for a hurried meal.

Shredded Codfish—Can be made into several palatable dishes.

Crystallized Egg—We can recommend this very highly; it is compact, light, good for omelets and scrambled eggs; cooked with codfish and flour, makes an excellent dish.

Malted Milk—A pleasant, nourishing drink; can be quickly prepared; keeps well in tins.

Army Emergency Ration—A mixture of meat meal, vegetable meal, curry, and other ingredients; can be eaten without preparation; good for soup or porridge; can be fried. There is with it a tablet of compressed sugared tea-leaves, sufficient for four quarts of strong tea. Put up in two-pound tins; is sufficient for one man for one day; is good for side trips away from the main source of supplies, where one is very limited as to weight.

Frame Food Stamina Tablets—A very concentrated form of food in the shape of small lozenges; conveniently carried in the pocket; extremely good for exhausting marches; can be procured from the "Frame Food Co.," London, England, at a shilling per box of about fifty lozenges.

Saccharine Tablets—Weigh practically nothing; a good substitute for sugar in cases of emergency. One tablet weighing only one fourth of a grain is sufficient to sweeten a cup of coffee.

Canned Ham and Bacon—We have been well pleased with our experiments in taking Armour's sliced ham and bacon. Much time is saved in the preparation of meals by having the ham and bacon already sliced. Besides, one is surer of having them the proper degree of saltiness than when purchased uncut. Although the tin weighs something, there is a saving in not having the bone or rind. The ham is sufficiently cooked to be eaten without further preparation in case of emergency.

Flour—We have tried the different kinds of flour, and find that the proportions given in the above list are satisfactory. The different kinds can be mixed in making bread.

Vigor Chocolate—Is more satisfactory than the other kinds.

Canned Vegetables—We fully agree with Mr. Solomons that canned vegetables are too bulky to be carried in large quantities; but we have found that it is possible to carry three or four tins, and that they add a pleasant variety to the meals.

Bills of Fare—It sometimes is a great annoyance when getting into camp to have to decide what to prepare for the next meal so that all will be satisfied with the quantity and the variety. After considerable experimenting, we reached results which seemed to suit our party. To give an idea of the meals we had on the march, I add the following bills of fare which are representative of the meals we had throughout our trips. As it may be of interest to compare our bills of fare with some given in the United States Army, I place a few taken from the "Manual for Camp Cooks" (a book prepared by the Commissary-General of Subsistence) by the side of ours.

BILLS OF FARE.

CAMP BILLS OF FARE.

Breakfast.

Germea.
Fried Ham.
Fried Sweet Potatoes.
Cold flap-jacks, butter.
Apple sauce.
Coffee.

ARMY BILLS OF FARE.

Breakfast.

Syrup, butter.
Hash.
White Bread.
Coffee.

Lunch.

Malted Milk.
Boned Chicken.
Flap-jacks and syrup.
Chocolate, Raisins.

Dinner.

Farina Soup.
Corned Beef Stew.
Mashed Potatoes.
Bread and Butter.
Cornmeal Pudding.
Cocoa.

Breakfast.

Rolled Oats.
Fried Bacon.
Scrambled Eggs.
Mashed Potatoes.
Coffee.

Lunch.

Beef Tea.
Vienna Sausage.
Flap-jacks, syrup, butter.
Tea.

Dinner.

Marrow Pea Soup.
Creamed Codfish with Egg.
Julienne.
Bread and Butter.
Stewed Peaches.
Cocoa.

Supper.

Stewed Apples.
Tea.
Bread.
Cheese.

Dinner.

Bean Soup.
Corned Beef Hash and Cabbage.
Mashed Potatoes.
Bread and Rice Pudding.

Breakfast.

Baked Hash, Onion Gravy.
Coffee.
Bread and Butter.

Supper.

Tea.
Bread and Syrup.
Cheese.

Dinner.

Vegetable Soup.
Baked Beans with Bacon.
Mashed Potato.
Bread.
Boiled Mush with Syrup.

Reflector Oven—I wish to add a word of approval of the suggestions made by Mr. Solomons concerning the reflector oven. We have met with much success in its use. It bakes bread and biscuits much better than the Dutch oven and is also excellent for roasting meats. If one is using saddle boxes it is well to have the oven made of such size that it will go into the boxes.

Frying-Pan Handle—Mr. Longley speaks of the advantages and comfort of having an extension handle for the frying-pan. We profited by what he wrote and used one, only instead of making ours of tin a foot long, we made it of wood the length of a broom-handle and twice the thickness. In one end was a hole or slit about six inches deep, large enough to hold the handle of the pan and this end was covered with tin to prevent its burning. To keep

the handle from slipping off when in use, a hole was drilled in the pan-handle and also in the wooden handle, through which a wire nail could be slipped. This handle weighs but little and is a great addition to the cooking outfit.

This article is written merely to give suggestions to those who may plan trips to the mountains. It contains a statement of things which we have used and found good. A number of articles of food, such as spices, might be added to the list of provisions. We omitted such things because no member of the party cared for them. Every party in preparing for the mountains must be governed to a certain extent by circumstances and by the tastes of its various members.

We believe that all the articles mentioned in the above list are suitable for trips which Mr. Solomons places in the second class, or trips into out-of-the-way districts, where for several weeks at a time it would be impossible to reach any source of supplies. We have used all of the articles on trips into some of the most remote and difficult regions of the Sierra. It may seem to some that our list contains too great a variety, and that some of the articles are unnecessary; but I think that Mr. Longley is correct when he says that the lists are not intended for the hardy mountaineer. They are intended for those who are accustomed to having variety in their meals, and we have found that it is not necessary to forego the benefits and pleasure of variety even in the most inaccessible regions. The benefits of variety far outweigh the disadvantages. We have returned from trips on which from morning till night, day after day, we have taken the hardest kind of physical exercise, in excellent condition and without having lost a pound in weight.

J. S. HUTCHINSON, JR.

NOTES FOR THE COMMISSARY.

When it is once decided that we shall go camping, and where, it is next to decide what we shall take. As to outfit and camp equipment, the files of the BULLETIN and other periodicals of the mountaineer and camper may be referred to with the certainty of finding a deal of good advice. As to what shall compose the store of provisions, as to the victuals of the camper, there is also no scanty measure of instruction and advice. But as to how much shall be bought of flour and bacon and coffee and the rest, I find less instruction.

From the experience of several summer outings in the Rocky Mountains of Colorado and in the Sierra Nevada, in each of which careful account was kept of the stores actually consumed, I have compiled the list which follows. The list includes only the staples,

the necessary and usual stores of the average camper, the college professor, lawyer, and doctor sort. The figures are based on the actual consumption of stores by parties of men who tramped and climbed and fished enough to have camp appetites, and who could yet go for a few days on close ration for the sake of light packs on a special climbing-trip. The amount of each staple given is in terms of person-weeks,—*i. e.* amount sufficient for one person one week. Modifications of these figures, caused by the obtaining of game, or by the addition of "luxuries," will be referred to later.

TABLE OF STAPLE PROVISIONS IN PERSON-WEEKS.

Wheat flour, 2.8 lbs.	Tomatoes, .33 can.
Graham flour, 1.1 lb.	Corn, .33 can.
Corn meal, 1.5 lb.	Dried fruit, .33 lb.
Sugar (white), 2 25 lbs.	Baking-powder, .13 lb.
Sugar (brown), .75 lb.	Salt, .5 lb.
Rolled Oats, .42 lb.	Butter (canned), .66 lb.
Breakfast Gem, .12 lb.	Cream (evaporated), 1 can.
Bacon, .66 lb.	Beans, .75 lb.
Ham, .9 lb.	Lard, .5 lb.
Corned beef, .36 lb.	Coffee, .33 lb.

To obtain total amount of any staple to be taken for a party of five expecting to be out five weeks, multiply the unit above given by 25; that is, multiply the person-week unit by total number of person-weeks.

On our mountain trips we have averaged about twenty trout per man per week. Their absence might necessitate a slight increase in amounts of meat.

If the camping-party is a hunting-party, and game is sure to be added to the bill of fare, the meats in above list may be reduced in quantity.

Of "luxuries," in addition to the above staples, every party will take a certain amount. We have had on various trips many different things, and on some of the trips a considerable quantity. But, as a matter of fact, I have noted that their presence or absence does not very materially alter the amount of staples used. And unless some luxury is actually substituted for a staple, the amounts of staples above given need not be much modified because of the addition of luxuries.

Among such luxuries we have found especially agreeable or convenient, chocolate (in pound cakes), beef extract (for the ailing member), little jars of club-house cheese, olives (a small keg can be carried easily), dates (especially good for coat-pocket lunches), little cans of jam, onions, canned fruits, maple syrup

(a small amount used to flavor the brown sugar syrup), nuts (like the dates good for mountain-top lunches), pilot-bread, tea, cocoa, rice, etc.

Of course, several of the necessary things are not included in the above list of staples. Such are pepper and yeast. The amounts to be taken are too small to make a showing in person-week units. No account is made in the list of potatoes. They are too heavy and bulky (too much water) to carry far. Where they can be obtained within reasonable distances of the camp, well and good; but for high mountain camps, where all the provisions have to be packed in on mules, better discard potatoes. Some have found "desiccated" potatoes good.

The beans should be cooked and dried before leaving home. Boil the beans at home without any salt in the water; when cooked spread them out and dry, and pack away in cloth bags. When in camp cook as usual with salt. These pre-cooked frijoles will not necessitate making permanent camp for a week in order to cook beans.

Graham-flour bread can be made more easily than wheat-flour bread if the baking is of the Dutch oven sort.

The amount of sugar may seem excessive to some. Sugar and sleep are the best removers of muscle-fatigue. If you don't like sugar, cut it.

The brown sugar is used for making syrup for pancakes. The sugar called "Hawaiian Golden" makes excellent syrup.

It is advantageous to use quickly cooking breakfast foods, such as "Breakfast Gem," flaked oats, flaked rice, etc., instead of the usual rolled oats, which require too long cooking.

The canned butter included in the staples may, of course, be classed with the luxuries. It is easily carried, keeps perfectly, and tastes well.

Finally, it is unnecessary to say that tastes differ, and with them the habits of campers relative to the selection of camp stores. These notes do not pretend to suggest the necessity of any particular stores. They simply give bits of actual camp experience. The advantage to the camper for the first time buying camp supplies of being able to know exactly "how much of what" other campers have found necessary and sufficient has seemed to the writer to warrant publishing the list. It was only last summer that the writer met a well-known mountaineer in the heart of the Sierra Nevada able and anxious to dispose of pounds and gallons of stores. He was lamentably overstocked. At the same time our party was watching the white sugar coming out even to the table-spoonful. We had bought by the table.

VERNON L. KELLOGG.

THE FRYING-PAN AS AN OVEN.

It may not be known to some readers of the Notes who look forward to pack-mule trips this summer, that a most satisfactory oven for baking bread can be improvised out of an ordinary frying-pan. The advantage of being able to do this is obvious. Few burden their packs with reflectors, none, probably, with Dutch ovens, while the frying-pan is never omitted. Now, this convenient and universal implement has one fault, especially in cooking food made of flour or meal: it compels the use of great quantities of grease. And the less grease the better, it is needless to say. Ovens require but little of this article. Take with you two common tin plates of such size that either will fit, bottom downward, into your frying-pan. The rim of the plate must engage the rim of the pan, so that there will be an air-space, the more generous the better, between the floors of the two vessels. Let these two become warmed, and then put your dough into the moderately greased plate and cover it with the second tin plate. You have now an almost perfect oven, the essential part of which is an air-chamber between the fire and the baking food. Your biscuits are almost as they are at home, and your stomach thinks you must have left that greasy frying-pan behind. The process is not slow, especially if your pans are hot in the beginning. The bread is easily turned by turning over the two plates.

Let me add, by way of postscript, that while your bacon provides plenty of grease, olive oil, carried in a can, is far better and more wholesome, especially in frying beans, that best friend of the tramper.

TRACY RANDALL KELLEY.

FORESTRY NOTES.

EDITED BY PROFESSOR WILLIAM R. DUDLEY.

THE CALAVERAS The sale of the Calaveras "Big Trees," and
BIG TREES. the unusual efforts of the people of California
 to interest Congress in their redemption have
attracted greater attention than any previous discussion connected specifically with the forests of the Sierra or of California. There are many other "Big Trees" (*Sequoia gigantea*, Lindl.) scattered from Placer County to the borders of Kern; but these were the ones best known to the hearts of men. Indeed, there are no other groves of trees in America that at all compare with them in this respect. During the fifty years they have been known to white men, they have not only been the object of pilgrimage by many a man of science of this and other lands, but hundreds of travelers, eminent and otherwise, have seen them. It was a sense of affection felt for them by this latter class, and based on a feeling of old acquaintance, that probably furnished the motive power for most of the extraordinary movement in favor of their preservation.

There are two distinct groves concerned in this question which has so interested us. The first is the "Mammoth Tree Grove," or "Home Grove," at the Big Trees Hotel and post-office, a small grove covering about fifty acres and containing, according to Whitney, of the California Geological Survey, ninety trees (and Mr. Sperry's recent statements agree with Whitney's). It is in Calaveras County, at an elevation of 4,700 feet. Five miles from the Home Grove, across the Stanislaus, in Tuolumne County, at an elevation of about 4,900 feet is the "South Park Grove," or the second of the so-called "Calaveras Big Tree" groves. It contains about 1,380 trees scattered over 1,000 acres, and in this grove *Sequoia* reaches as grand proportions as anywhere in the Sierra. Both these groves are some miles outside the boundary of the Sierra Forest Reservation. The first named is really the famous Calaveras Grove—the one about which many scientific data were gathered thirty years ago—data of increasing value as time goes on. This is the one whose trees were first seen by white men—

probably by General Bidwell* in 1841, certainly by Doud in 1852. Specimens from this grove were sent to our American botanists, Asa Gray and John Torrey, to be named, but the specimens were lost; those sent to England reached John Lindley, and he had the honor of giving the specific name *gigantea*, which has been so long accepted by the world, if not by the botanists. Seeds from this grove were scattered through the gardens of Europe, and a vigorous generation of young trees is bringing back to that continent the traditions and memory of *Sequoia*, which perished from it with the Tertiary. This is almost the only grove visited by Asa Gray, Sir Joseph Hooker, and the scientific travelers of the earlier days; and Gray's classic address, when President of the American Association for the Advancement of Science, in 1872, upon "Sequoia and Its History," was in part written beneath its shade. Most of the rush of modern railroad travel, it is true, now passes through the Mariposa grove, but it thinks little and writes less about that grove. A few men of science know of thirty other groves of *Sequoia gigantea*, but few, except the lumbermen, believe this to be a fact; therefore it still remains true that all the history and the literature of *Sequoia*, and a good deal of the scien-

* John Bidwell, proprietor of Rancho Chico, a pioneer in fruit growing, enterprising in the better movements to develop the resources of California, and in 1892 the nominee of the Prohibition party for President of the United States, "was probably the first white man who saw one of these trees. In 1841 Bidwell crossed the Sierra Nevada from the East; descending the Stanislaus River, he became separated from his party while hunting, and in the evening of October 20th, when it was too dark to see distinctly, he came upon an enormous fallen tree, which many years after he recognized in the tree of the Calaveras Grove known as 'The Father of the Forest.' He found a hiding-place for the night, not however remembering the standing trees, being disturbed, as he supposes, by the dread of Indians, signs of whom he had seen during the day."—[See Sargent (*N. A. Sylva* 10: 147), who received this account from Mrs. Bidwell in a letter.]

It is fitting to the dignity of the species, that the noblest of all trees should first be seen by a young man who afterward became one of the wisest and best citizens of a great State. The Sierra Club invited General Bidwell to address the public meeting in March, called to support the Calaveras Grove movement, but he was unable to attend. The following note, written on that occasion, is pregnant with the best advice. Since then he has passed away from a long life, useful to his State and Nation.

"CHICO, CAL., Mar. 6, 1900.

ROBERT M. PRICE, *Secy. Sierra Club, S. F., Cal.*:

Dear Sir:—Of course, the Calaveras Big Tree Groves must be saved at all hazards. They are among the greatest wonders of the world, and the most accessible of all the Big Tree Groves, which should all be preserved. And further, the present havoc going on by the lumbermen and shakemen threatens at no distant day the entire destruction of the Sierra Nevada forests, so necessary to the preservation of the springs and living streams, which are of untold value, and add much of life and beauty to the mountains. All further sale of timber-lands should at once cease, and all use of timber should be under the most wise and economic regulations possible to be devised by the Government.

Save the Big Trees. Save all trees as far as possible.

Yours with highest respect,

JOHN BIDWELL."

tific interest concerning the species, center around this grove. It is imperative, therefore, that Californians should redouble their efforts at the present time and support their delegation in Congress in its efforts to lift the matter out of its discouraging plight, and push the bill for condemnation proceedings.

Mr. James L. Sperry had owned these groves for nearly fifty years, and had given them reasonable care. He had endeavored to sell them to the United States, had urged Congressmen and others in authority to favor this plan, but without avail. On December 28, 1899, he bonded his entire forest — 2,320 acres, including the "Home" and "South Groves," to R. P. Whiteside, a capitalist or speculator of Duluth, Minn. Whiteside had purchased not less than 8,000 acres of timber-land in that vicinity. The bond continued till April 1st, when the Sperry tract was to pass absolutely to Mr. Whiteside for the consideration of \$100,000, if the latter's examination of the timber, through his "cruisers," proved satisfactory.

On January 5th this deal became known to the late P. A. Buell, of Stockton, President of the San Joaquin Valley Commercial Association. On January 6th he laid the matter before that association, in a meeting at Hanford, which adopted a "resolution to memorialize Congress to preserve the Calaveras Big Tree grove." Thereupon President Buell appointed a committee to secure the necessary facts for future action. He also appealed at once to the Sierra Club and the California Waters and Forest Association for co-operation in order to save the trees. On January 12th, the first account of the transaction between the owner and purchaser appeared in the San Francisco papers. On the night of January 22d, before an audience that filled the Metropolitan Temple, President Jordan, of Stanford University, made an impassioned appeal for the preservation of the forests of California. He announced the proposed sale of the Calaveras Grove, described it as the noblest forest in the world, and declared it to be "more the duty of the nation to preserve its forests than to foster commerce." Petitions from various parties or institutions were forwarded to Congress. Still it remained for the California Club to organize public sentiment in the State in favor of Government interference, and to make that sentiment irresistibly felt in Congress. An immense labor though it was, the women of this club appear to have been the only influence which thoroughly aroused the public and gained the attention of the people, not only of this State, but of the nation, as well as that of Congress. They bent their energies to the task of getting petitions in California and to personal interviews with the Congressional and Executive officers at Washington. The California papers have given a great deal

of space to the question and materially assisted the friends of the movement.

Congressional action finally took the form of the following resolution, introduced by Congressman De Vries:—

“Resolved by the Senate and House of Representatives of the United States of America in Congress assembled: That the Secretary of the Interior be and hereby is authorized and directed at the earliest practicable date, to open negotiations for, and if possible procure a bond upon, the lands occupied by the said groves of trees,” (i. e. the “Mammoth tree grove” and the “South Park grove” mentioned in the preamble,) “with sufficient adjacent lands for their preservation, management and control, and submit the same to Congress for action thereupon.”

The bill, introduced February 12th, was reported back from the Committee on Public Lands on February 21st, passed by the House on March 3d, and by the Senate on March 7th,—in both cases without a dissenting vote,—and on March 8th the President signed it. The rapidity of this action shows not only the great interest of the Congressional delegation from California, but the active sympathy of many other members and of President McKinley.

Mr. Whiteside came into full possession of these trees on April 1st, and has declined to sell to the United States except for about ten times his purchase price. This ought to be a lesson to Columbia, who has been practically giving away her forests by the million acres to her ungrateful children. The United States would only be exercising common prudence if it withdrew at once every acre of its forest-land from sale and entry.

The latest official utterance on this question is in a letter from the Secretary of the Interior to Congress, submitting the correspondence with Mr. Whiteside. He says, “If it is desired to obtain the title to these lands and to perpetuate the mammoth trees, it will have to be done through the means of the exercise of the power of eminent domain.” It would be only proper, at this stage of the proceedings, to exercise this power over the entire 8,000 Whiteside acres, and thus expedite that capitalist’s return to Duluth, if such a thing is possible.

FOREST The writer spent about six weeks in the summer of
 FIRES. 1899 traveling through the forests of Humboldt, Del Norte, Siskiyou, and Shasta counties. A great fire was working its way through the Upper McCloud River Valley, and minor ones were seen in other regions. In certain regions of the Siskiyou Mountains fires of previous years had destroyed from one half to nine tenths of the timber. Such devastation (the greatest except the lumberman’s) of the primeval forest deter-

mined me to make further inquiries by letter. Fifty or more were sent to reputable correspondents in all the mountain counties of the State. The uniformly candid replies showed that above 850,000 acres of forest land in California, north of the Tehachapi, were burned over in 1899. The largest was in the Upper McCloud Valley. It burned nearly all summer, and extended over about 250,000 acres, occasioning a loss of \$500,000. The next largest was in the Tuolumne County forests. One hundred thousand acres of redwood land in Mendocino were also burned over. Severe forest fires also occurred in Western Siskiyou County and in Plumas County. The Mt. Tamalpais fire was a comparatively small one,—2,000 acres,—although it attracted great attention in San Francisco. A severer and more destructive one occurred near Wrights Station, destroying houses, barns, and orchards. All of these fires occurred outside the forest reserves.

In the latter is now a very efficient force of "rangers," such as were specified in the last BULLETIN. The California forest reserves north of the Tehachapi cover about 5,000,000 acres, and it is most gratifying to learn that in that whole area, the official reports show less than 2,000 acres burned over in 1899. Contrast this with the 850,000 acres (which would mount up to 1,000,000 acres on the basis of complete figures).

In the recent report of the U. S. Geological Survey (Vol. V) on the forest reserves, a map of the forested area of Western Washington shows that out of 14,000,000 acres of natural forest above 2,600,000 acres are worthless, from destructive forest fires. It is useless to multiply arguments or facts on this subject to readers of the BULLETIN, but it is the duty of every one to urge the early and rapid development of a United States Forestry Bureau, that all our forests may be at least as well protected as they are now in the forest reserves.

The writer would be glad of communications on the subject of forest fires for the season of 1900.

THE YALE SCHOOL OF FORESTRY. "At a meeting of the Yale Corporation, held at New Haven, Conn., March 16, 1900, President Hadley formally announced the gift of \$150,000 to Yale University from Mr. and Mrs. James W. Pinchot, of New York, and their sons, Gifford Pinchot and Amos R. Eno Pinchot, both graduates of Yale, for the foundation of a school of forestry as a department of the University. Upon the acceptance of the gift, Henry S. Graves, Yale, '92 (now of the Division of Forestry), was appointed professor of forestry. The regular work of the forest school will begin with the opening of the University in the fall."—*The Forester, for April, 1900.*

We also learn that U. S. Hydrographer F. H. Newell and Mr. Gifford Pinchot will be special lecturers, and that the house of the late Professor O. C. Marsh, on Prospect Street, will be used for the forest school. Mr. J. W. Pinchot has also given the use of a considerable tract of forest land near Milford, Pike County, Pa., for the practical summer work of the school.

All of this is a fine inspiration for those who are laboring without compensation to establish forestry in America on a permanent basis. Mr. Gifford Pinchot has not only given his life to this work, but a generous portion of his fortune.

THE A preliminary meeting of representatives from the
BIG BASIN. peninsular counties was held at Stanford University on May 1st, to consider the establishment of a public forest park in the Santa Cruz Mountains, in that region known as the "Big Basin." Maps, statistics, and plans of operation were laid before the meeting, and a committee of ways and means was appointed, consisting of ex-Lieutenant Governor Jeter, Santa Cruz; Rev. Dr. Kenna, Santa Clara College; John E. Richards, Esq., San José; Professor Senger, of the University of California; and W. R. Dudley, of Stanford University.

FORESTRY WORK FOR 1900.

A recent letter from the United States Forester promises the presence in California during the coming summer of at least four of the principal members of the Division of Forestry staff. The Forester and Chief of Division, Mr. Pinchot, will come to Arizona in May, accompanied by the Chief of the Division of Botany, and will be in California in July. One assistant will continue in charge of the investigations in the northern redwoods; another will assist the United States Geological Survey in their forestry investigations in the Sierra, while a third will investigate an important question — the influence of the forest on the run-off in San Bernardino County. Mr. Lippincott, of the Hydrographic Bureau, will continue his work on the measurement of the stream-flow in California; Dr. Elwood Mead, with the assistance of several well-known engineers, will begin very soon the investigation of irrigation problems in some of California's most fertile valleys; while the Geological Survey continues its invaluable topographic work. All this work is done at the expense of the United States Government, and the particular favor shown this State is due to the active interest of its citizens in the problems of forestry and irrigation.

THE DUTY OF WHEN will this State, the wealthiest on the
THIS STATE. Pacific Coast, do more than this, and vote money to assist the National Government in its impor-

tant work in developing the State's natural resources? The following letter from Charles D. Walcott, Director of the United States Geological Survey, to Mr. J. B. Lippincott, recently published in the *Los Angeles Times*, shows that this State has not done what other States much less benefited by the great topographic survey have done: "In California there has been in the past an apparent lack of appreciation of the systematic work which has been carried on, this being in marked contrast to the active interest displayed in similar investigations in other localities." In several instances in the East, the State had co-operated with the General Government in defraying the cost of survey and thus greatly expediting the work; for instance, the total cost of surveying Massachusetts was \$107,845, of which the State appropriated \$40,000. The total cost of New York State was \$216,000, of which the State bore \$86,000. Now, the geodetic survey must be completed before we can have the data for locating and building Government reservoirs.

"NORTH AMERICAN FORESTS AND FORESTRY." This is probably the first book of its kind to be published in America. It is written by Ernest Bruncken, Secretary of the Wisconsin Forestry Commission, and is published by G. P. Putnam's Sons in a very creditable manner. If we were disposed to be critical, we should find fault with its English and some of its statements in geography and the field of science. But these are trivial defects when contrasted with the good it will certainly do in educating the people in forestry. In a popular way, it not only gives facts on forest industries, but is sound in its statement of the relation of man and communities to the forest, in its discussion of fires, the profits of the forests under a good forestry system, and the methods of lumbering in North America. We can commend it to those wishing information on these subjects.

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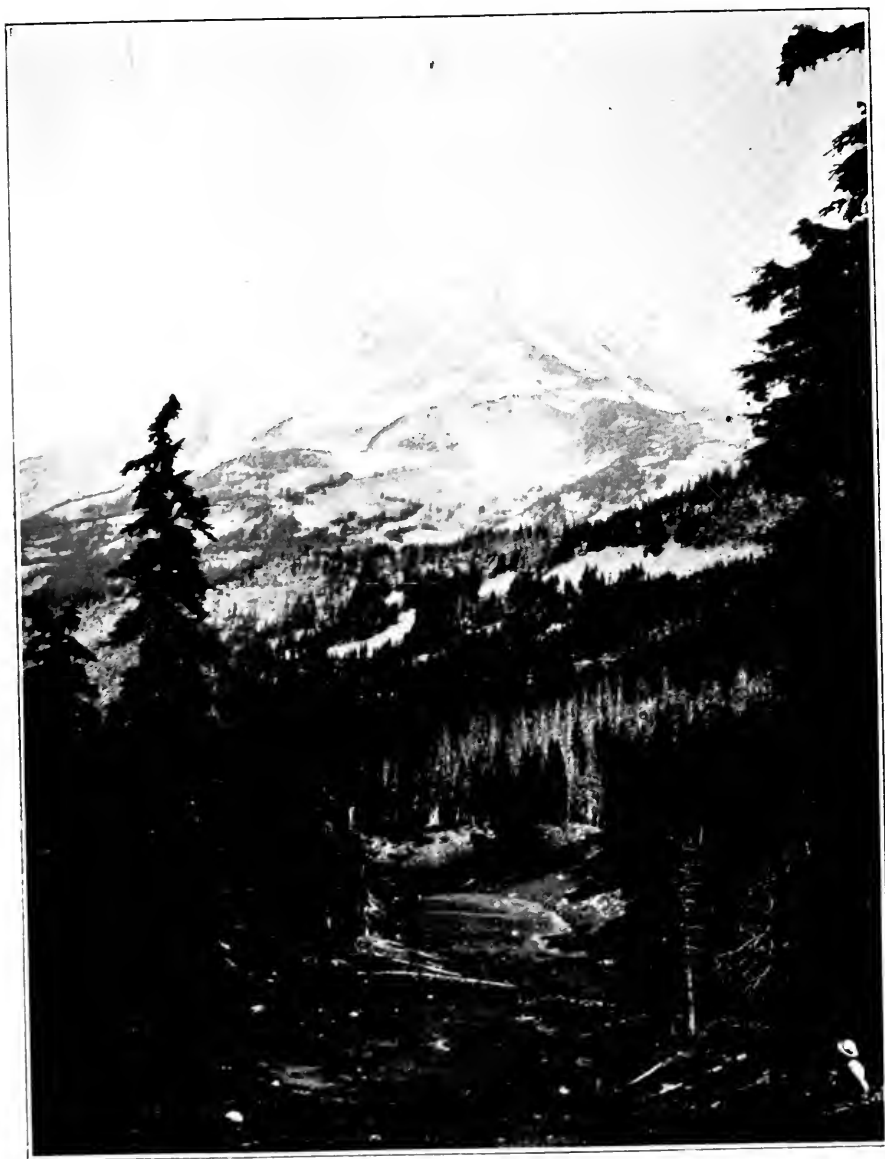
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All communications intended for publication by the SIERRA CLUB, and all correspondence concerning such publication, should be addressed to the Assistant Editor, J. S. Hutchinson, Jr., Sierra Club, Claus Spreckels Building, San Francisco, California.

Correspondence concerning the distribution and sale of the publications of the Club, and concerning its business generally, should be addressed to the Secretary of the Sierra Club, Merchants' Exchange Building, San Francisco, California.





MT. JEFFERSON FROM THE PASS TO MARION LAKE, ACROSS THE HEAD OF
HUNT'S COVE

(See Page 26.)

SIERRA CLUB BULLETIN.

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No. 3.

PARKS AND PEAKS IN COLORADO.

BY VERNON L. KELLOGG.

The alliterative title of this paper is chosen primarily for its pleasant-sounding (or unpleasant, if you take such things that way), and, secondarily, because only so comprehensive a subject name can include the fragmentary things I shall write about a few Rocky Mountain parks and peaks in particular, and of the "physical features" of the Colorado Rockies in general. The aim of the writing is to compare, in some points, the sculpturing of the higher Rocky Mountain region of Colorado with the higher Sierra Nevada region of California. With this clew to the coming-out place, the tangled trail through these notes may be pretty safely set out on.

If one enters Colorado from the east the State is distinguishable from Western Kansas or Nebraska only by the line-posts; the gradually-lifting plains plateau, which is nearly 4,000 feet above sea-level at the Colorado-Kansas line, extends on for two fifths of the State's east-and-west extent, until one comes to the abrupt lift of the Front Range of the Rockies. No such dizzying leap up is this as that from the Owen's and Inyo Valleys to the main crest of the Sierra Nevada, where a trail of less than ten miles

takes one from Independence, at 3,500 feet, to Kearsarge Pass, at 12,000 feet, or to the adjacent summit of University of California Peak, at 14,000 feet. But it is not far in miles of going from any one of the score of towns which lie at an altitude of 4,500 to 5,500 feet, stretched in a north-and-south line along the eastern base of the Front Range, to altitudes similar to those of the Sierran points mentioned. From Golden (5,500 ft.) up the Clear Creek Cañon, by Idaho Springs and Georgetown, to the summit of Gray's Peak (14,341 ft.) is but thirty-four miles from Boulder or Lyons (towns fifty miles north of Denver) up the St. Vrain Cañon to Table Mountain Pass (12,500 ft.), or to the summit of Long's Peak (14,271 ft.), is but twenty-five or thirty miles. From Colorado Springs (6,000 ft.) to the summit of Pike's Peak (14,149 ft.) it is ten miles. And right here it is well to warn Sierra Club members against the too common mistake of taking Pike's Peak as a representative Colorado Rocky. A noble mass, with a fine height, and a large "looming" from the hotel verandas in the "Springs," it has never had on close acquaintanceship much of anything in the way of rock-climbing or narrow edges, or great arêtes or snow-masses, nor, finally, of views, to reward the mountaineer. And now, poor chained, tamed, domesticated mountain of the Colorado Springs and Manitou hotel backyards! striped with mule trails, boulevarded and macadamized for carriages, dynamited and gashed and seared for a screechy, smoochy, loathly little steam-train, and bearing on its shamed crest a cheap lunch-counter — Pike's Peak can only be sorry that persevering Pike ever found it. Pike's Peak is a nice family mountain for the hardy mountaineers of the Kansas City bluffs to "climb"! Another common mistake is to take the signboard "Summit" which ones sees in Wyoming or in Arizona when "crossing the Rockies" in a Union Pacific or Santa Fé combination car, as meaning anything more than that you

are, at this point, crossing the lowest findable saddle in a very much subdued portion of the Rocky Mountain system. Crossing Tennessee Pass, or Marshall Pass, or Hagerman Pass (each about 12,000 ft.), is really crossing the Rockies.

To get back to the trail! Once having reached the mountains in coming into Colorado from the East, you are in them at all times and in all places until you get wholly over and through Colorado and across its western boundary on to the Utah plateau. The Colorado Rockies are not a single great north-and-south chain, or two or three of them, but a host of them, or parts of them, and these so turned to one side or the other and branched and joined and cut apart, and fissured longitudinally and transversely and diagonally, that you simply have a labyrinth of high ridges and deep cañons, spotted every here and there with a little or a big smooth-bottomed, quiet grassy park, in which you may take full breath after your ups and downs, and collect your wits scattered in trying to follow the erratic course of some particular chain of peaks. These parks, and not the Royal Gorges and Red Cañons and Black Cañons of the seductive railway-folder, are the beauty and the delight and the "scenic marvels" of Colorado; for these parks offer not only their own beauty and interest as charm, but they give opportunity for such sweeping, eye-filling views of the Colorado peaks and crests as are never permitted the stifled camper in a V-shaped cañon or vertical-walled Yosemite. And conversely from the peak-summits of Colorado the eye, confused and tired by the unending repetition of ranges and mountain-tops in one direction, finds relief in another in the restful unrolling of the soft level floor of one of these great glacial meadows. These parks are legion, and range in size from the North, and Middle, and South Parks, with their scores of square miles of extent (too large these are, indeed), to the gem-like Estes, and Willow, and

Horseshoe, of a few thousand or few hundred acres, and to the unnamed tiny dots of a few scores or tens of acres.

For a closer acquaintance with some of these parks and peaks than that to be got from any further bird's-eye viewing of them, we may leave Denver at ten o'clock in the morning and ride by rail fifty miles north along the base of the Front Range to an unlovely little town—Lyons. The country thus traversed is partly under irrigation, and partly as yet unreclaimed. To the right stretches the long plains; to the left rise the narrow foothills ranges, backed by the great Front Range with its many peaks. From Gray's and Torrey's, in the south, to Long's, in the north, is a long and splendid stretch, and the snowy summits—if your traveling be in June—will reveal what an untrained eye might otherwise not be sure of, that they are really the mountains, and not the foothills, which limit the western view. At Lyons a hasty lunch and a swift glance at the extensive quarries of soft red sandstone, and you pop into your place beside the driver of the daily Lyons and Estes Park stage. The "stock" is lively, and at the word is off with a rush on the twenty-five-mile pull up and over the foothills to Estes Park. Barely out of the little town you cross and turn sharply to follow up a clear rushing stream—the St. Vrain. At once you are in the cañon; the plains are gone; the roadway is cut out of the rock banks; it is a mountain road along a mountain stream. And from this moment on you are always with or near rushing water, moving along by it, climbing up and out of a cañon away from it, or racking and sliding down a cañon-side to it. And this is a joyous difference from the long, hot, dusty, body-wearying, and nerve-racking struggle through the dry foothills which guard access to the joys of the High Sierra. Not, indeed, if one enters the Sierra from the east side; but one does n't. We enter from Bakersfield, from Visalia, from Fresno, Sanger, Raymond. I once drove into the



WILLOW PARK (7,500 FT., ABOUT 1,000 ACRES), NEAR ESTES PARK, COLORADO.

Taken from 500 ft. above the park floor, looking west. Lateral moraine at left, terminal moraine with stream cutting through in middle. Big Thompson Cañon extending back to the Front Range. Highest mountain (left background) is Stone's Peak (13,800 ft.).



Yosemite from Fresno. Shall I ever forget that torturing longing for the real mountains, with a real mountain stream to begin, that horrible camping by the dusty roadside or in a worse than dusty barnyard, so as to be near the well of tainted, tea-warm water?

The first view of the park is from its eastern rim, at an altitude of 9,000 feet. At the top of a rather long climb the whole beauty of the admirable Rocky Mountain combination of park and peak is revealed at first glance. Lying nearly 2,000 feet below, like a spread-out map, is the park floor, with its central winding stream bordered with a thin fringe of willows, alders, pines, and blue spruces, and here and there gliding through a level meadow, with its banks quite naked. From the floor rise what we may call the "interior mountains." Here a great mass like Deer Mountain, a thousand feet above the park level, and there the fantastic wind-hewn rocks of McGregor's lifting precariously their few hundred feet; and, inclosing all, the great, rough, high mountain rim formed on three sides—north, west, and south—by the crest and peaks of the Front Range and two of its lateral spurs. A breath-taking view this, and wholly comparable, despite all of its differences, to the first acquaintance-making with Yosemite from Inspiration Point, or with the Cañon of the King's from Grand Lookout.

Swinging noisily down to the park floor and along the swift stream in its center, we find that the twenty square miles of this floor are sufficiently diversified in character for all practical purposes of "scenic marvel" making. Side streams come in to feed the central Big Thompson, and each gives a view up a cañon. Knolls and giant rocks unperceived in the bird's-eye view are very apparent to the closely applied eye, and the view and aspects of the interior mountains and of the great mountain rim change with every dip and turn in the road.

This fine natural mountain pasture has not been overlooked by the ubiquitous cattleman. Seven thousand acres are owned by an English company, and numerous pioneers have homesteaded claims all about. But only a few all-year residents have homes here, and these half-dozen ranches have for their chief business the care of summer visitors. One can live at one of these log-cabin ranches as "boarder and lodger," or can camp where you will and rely on the nearest ranch for supplies of milk and butter, and mail. Of late years a number of private cabins for summer habitancy have been builded, especially by Denver and Kansas people. Estes Park is thus not as wild a mountain resort as the King's River Cañon, nor as humming a tourist-hive as the Yosemite.

As side-rooms, opening into Estes Park proper through narrow doorways and on a slightly higher level, are two much smaller parks, named Willow and Horseshoe. And in either of these we may see readily how the Colorado Park comes into existence. Of the two, Willow (see photograph) is the more symmetrical gem—an intaglio carved by ice and water in the granite rocks of the range's flank. Entering from Estes Park, one scrambles up the rough road by the side of the stream,—a torrent, a cataract here,—both road and stream struggling among great boulders and frost-split rock-masses, until on the sudden you are out on the level thousand-acre floor of the park. The steep, narrow entrance, the great rocks, and the flat floor above all, combine to tell you quickly that you have just clambered through and over a terminal moraine; following in along the way that the stream has cut in its going out (see photographs). The park extends east and west for two and a half miles, and has a north-and-south width of about a mile in its widest part. It is the opening out of a great cañon which cuts down eastward from the summit of the main crest. The north and south boundaries of the park



PART OF THE GREAT LATERAL MORaine, BOUNDING WILLOW PARK,
COLORADO, ON THE SOUTH.

(Peaks of the Long's Peak Spur in the background—Glacial Knoll in foreground.)



AN AMPHITHEATER IN THE FRONT RANGE, COLORADO, LOOKING
N.W. FROM E. SUMMIT OF STONE'S PEAK (13,500 FT.)



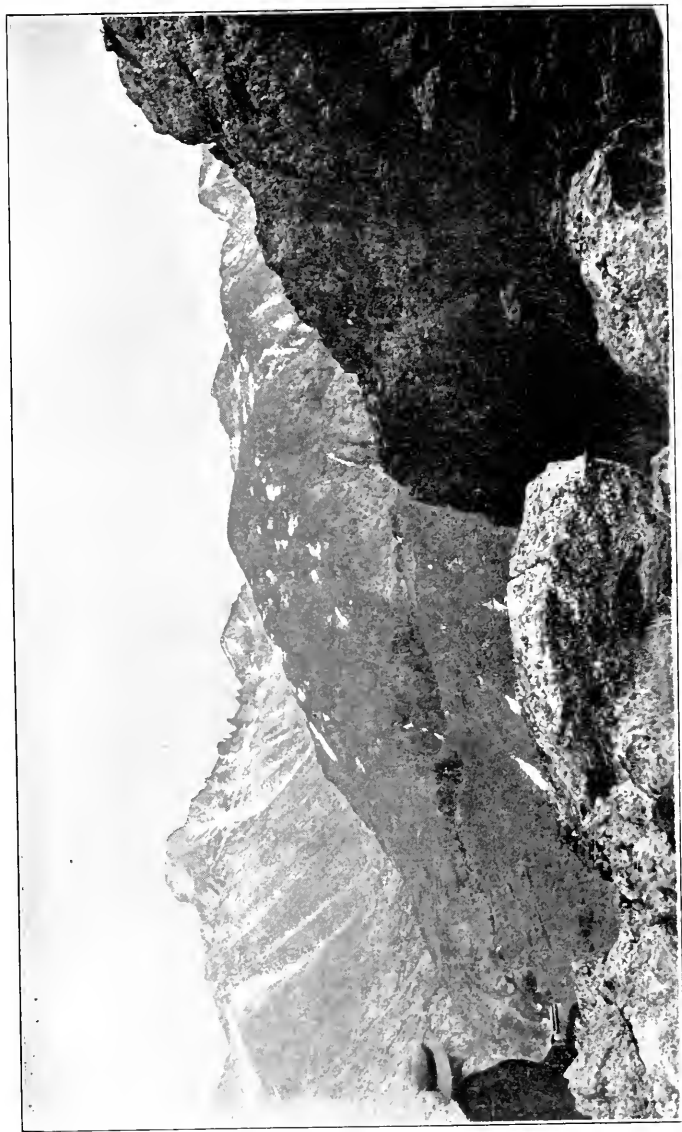
are the long lateral moraines rising five hundred feet above the park floor. The southern one of these (see photographs) is of remarkable symmetry, with a smooth, perfect face at an angle as steep as loose soil and stones will lie, and with a narrow, level, knife-edge ridge, running unbrokenly from beginning to end in the tumbled terminal moraine. I have seen no more symmetrical lateral moraine anywhere in my limited experience in Rockies, Sierra Nevada, and Alps. The northern moraine is more worn and broken, but is perfectly distinct as to general outline. On the floor of the park there is but one interrupting knoll, a smallish rock-mass of a few acres lying wholly isolated in the center of the flat wet meadow. The ice-plane could n't cut this down, and so ran heavily over it, rounding and smoothing it. Since then frost and storm-wind have roughened it, and scrubby pines and loud-voiced woodchucks have come into possession.

Winding most deviously, branching most confusingly, and ever shining in the sun, is the clear stream. Half of the whole park floor is in its possession; and you do not begrudge it its grasping fingers. If it plunges and roars, strong-voiced, as it fights its way through the rock dam of the terminal moraine, here where the park surrenders to it, it simply sings and lisps. It is clear as water can be clear; the trout live open and unhidden in it, and the tall grasses and low willows nod over its edge.

The symmetry of this park gem is not its only beauty; its setting is its great glory. Looking westward, range-ward, up the cañon, one sees the stretch of the crest, with Mts. Ida, Hallet, Stone, and Ypsilon, all peaks of about 13,500 feet. To the east the view is through the narrow entrance across in thin air to an oddly sculptured spur of high hills which push into Estes Park from the south. Rearing their heads above the bounding moraines are the summits of the great Long's Peak spur to the south, and

those of the Mummy and Hague's in the north. Long's is the greatest of all, lifting its flat-topped cube of a cap to a height of 14,271 feet; Hague's rears its rampart-like face to 13,900 feet. None of these summits is more than ten or twelve miles distant by actual trail from the park, and the dark forest-covered and cañon-gashed flanks slope roughly down to the very park limits. In the heads of these cañons the snow lies heavy and long, and already two small real ice-masses, glacial remnants, have been discovered.

Long's Peak (see photograph), the highest and greatest of all the northern Colorado mountains, is now climbed repeatedly each summer. Lamb, the guide, has made a hundred and more ascents. But when I first knew it, twelve years ago, it was talked of as a dangerous mountain, and surely not to be undertaken without the guide who had then been up ten or twelve times. The difficulty in its climbing lies in the heavy storms which break on it, and the necessity of finding the single way by which its top is to be reached. It is a most inclement weather that rules Long's, the climbing season being practically limited to five or six weeks in midsummer. Two deaths have occurred on the peak; one of a woman mountaineer who persisted on going up in the latter part of September, and perished in a storm despite the heroic struggles of guide Lamb; the other of an inexperienced man, who foolishly carried his revolver, and falling on the Narrows (see photograph) accidentally shot himself. His companion had a night of horror on this narrow edge with the dying man. I have climbed Long's five times. One time I had a clear view. Other times the snow and sleet came, or the usually present cloud-streamer folded about us wet and cold. The ascent when once above timber-line begins along the northeast face, turns to the northwest knife-edge, through the Keyhole, thence precariously along the great western slide-face (see photograph), pushes



LONG'S PEAK (14,271 FT.), COLORADO, TAKEN FROM TABLE MOUNTAIN (12,500 FT.)—LOOKING AT THE WEST FACE.

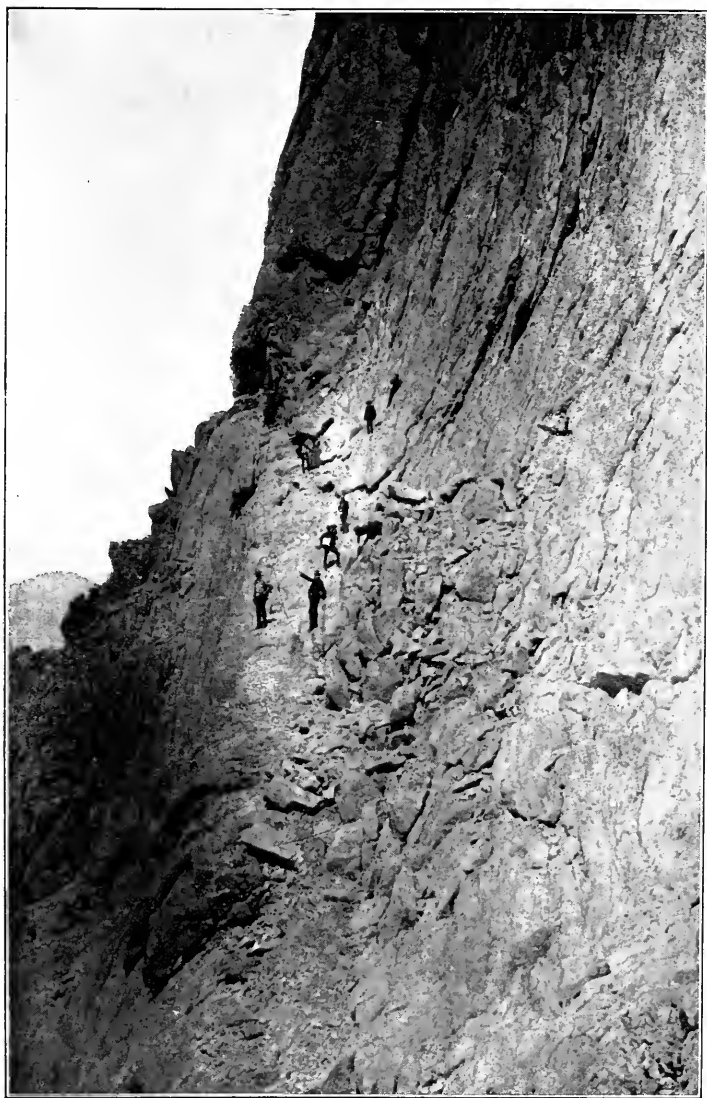


up through the long, steep snow-filled Trough on the southwest corner, then dizzyingly along the Narrows (see photograph) on the south face (a ledge midway along a rock face 2,000 feet high), and finally up the southeast ridge to the flat, bleak top. If one is inclined to become dizzy, or if a snow-squall is frightening, or if one objects to use hands as well as feet in climbing, then Long's Peak is a difficult, and even dangerous, mountain. Otherwise, it is a good mountain, and mostly a joy. The western amphitheater is tremendous, and the southern face something not to be forgotten; but the greatest part of it all is the sheer vertical cliff of the eastern face with 1,200 feet (by careful measurement) cleanly vertical, and 900 feet more but slightly out of the perpendicular. At the bottom of this cliff is a tiny green lake, and stretching away from it to the east is a great gorge bounded by straight, even-tapering lateral moraines.

With not a word yet about the life of the Colorado mountains, about the Rocky Mountain sheep, the ptarmigan, and the leucostictes of the alpine zone above timber-line, nor about the mountain lions and deer, the hermit thrushes and Canada jays of the great spruce forests on the upper slopes, and the occasional grizzly, the dusky grouse, the meadow-larks, blackbirds, and trout of the parks and the near-by cañons; nor yet a word of the forests and flowers, the characteristic blue spruces (*Picea pungens*), most beautifully colored of all the conifers, the gentians and columbines, the sweet red raspberries, and above all the fragrant beds of tiny alpine buttercups and forget-me-nots, dwarf columbines and other unknown beauties which lie abundantly on the very summits of the range, crowding against the great snow-banks and making an oozy carpet in their drippings,—with not a word of any of these, I am near the limit of my pages. Of the "big-horn," the Rocky Mountain sheep, and of their gathering-places, the broken,

breccia-turreted, obsidian- and lava-strewn crater of an old volcano, and of my hunting them there with a tiny camera, I really want to tell in some future BULLETIN. It was rare sport, and had — well, results.

The principal difference between the plant life of the Rockies, as I know it, and that of the Sierra depends on the more receptive character of the Rocky Mountains regarding water as compared with the Sierra. Concerning the actual rainfall on the Front Range and that on the Sierran crest in the King's River or Merced region I am not informed; but in the Rockies there are flat places, and little meadows and pastures, and shallow ravines, and much undergrowth and turf all over the high mountain flanks. The water is caught and held, and everywhere plant life is lush. In tramping with pack-animals in the Rockies I have rarely had to fear lack of water or grass. In the King's River mountains it is well to know your camping-places before you venture out on the trail. There are no such magnificent forests in the Rockies as those of the Sierra; no such superb trees as the sugar-pine, the silver fir, and the other great ones, to say nothing of King Sequoia. There are, however, (or, alas, were—for last summer's fires carried off thousands of acres of the Colorado forests,) beautiful forests of great extent of spruce; miles and miles of forest all of the one species (*Picea Engelmanni*), and all the trees similar in size and height, a hundred feet of straight, tapering pole with regular whorls of downward-pointing branches. The flowers in the park meadows, the buttercups, the blue larkspurs, the yellow potentillas (half a dozen species), the little stonecrops, the blazing-stars, the asters and cornflowers, the showy lilies (*Lilium Philadelphicum*) and blue flags (*Iris Missouriensis*), a mariposa lily (*Calochortus Gunnisoni*), and in the wet places the gentians, and in the hidden places the graceful columbines,—all combine to make a brave flower-show. Probably the King's River



LONG'S PEAK, COLORADO (14,271 FT.)
(The "Narrows" on South Face.)

Cañon in the days when John Muir wrote of it, before the sheep came in, offered a better show; but of late years how meager the gardens there have been!

I have written of but one park and peak center. But Colorado is full of such groups. In the southeast is Mt. Blanco, the highest of all Colorado Rockies; south of Leadville are the college peaks, Yale, Harvard, and Princeton, a magnificent group, going above 14,000 feet; in the southwest is the San Juan country; in the west Mt. Sopris; and so on with the catalogue. In height the Colorado and the California peaks agree; Mt. Whitney is higher than any Colorado summit; but I believe there are more peaks above 14,000 feet in Colorado than in California. In cliff-faces, in snow-masses, in rock-gorges, and knife-edges the Sierra and the Rockies are alike. The distinctive feature of high California is the "yosemite," the vertical-walled, flat-bottomed "grand cañon"; the feature of high Colorado is the "park."

THE WORK OF THE DIVISION OF FORESTRY IN THE REDWOODS.

BY R. T. FISHER.

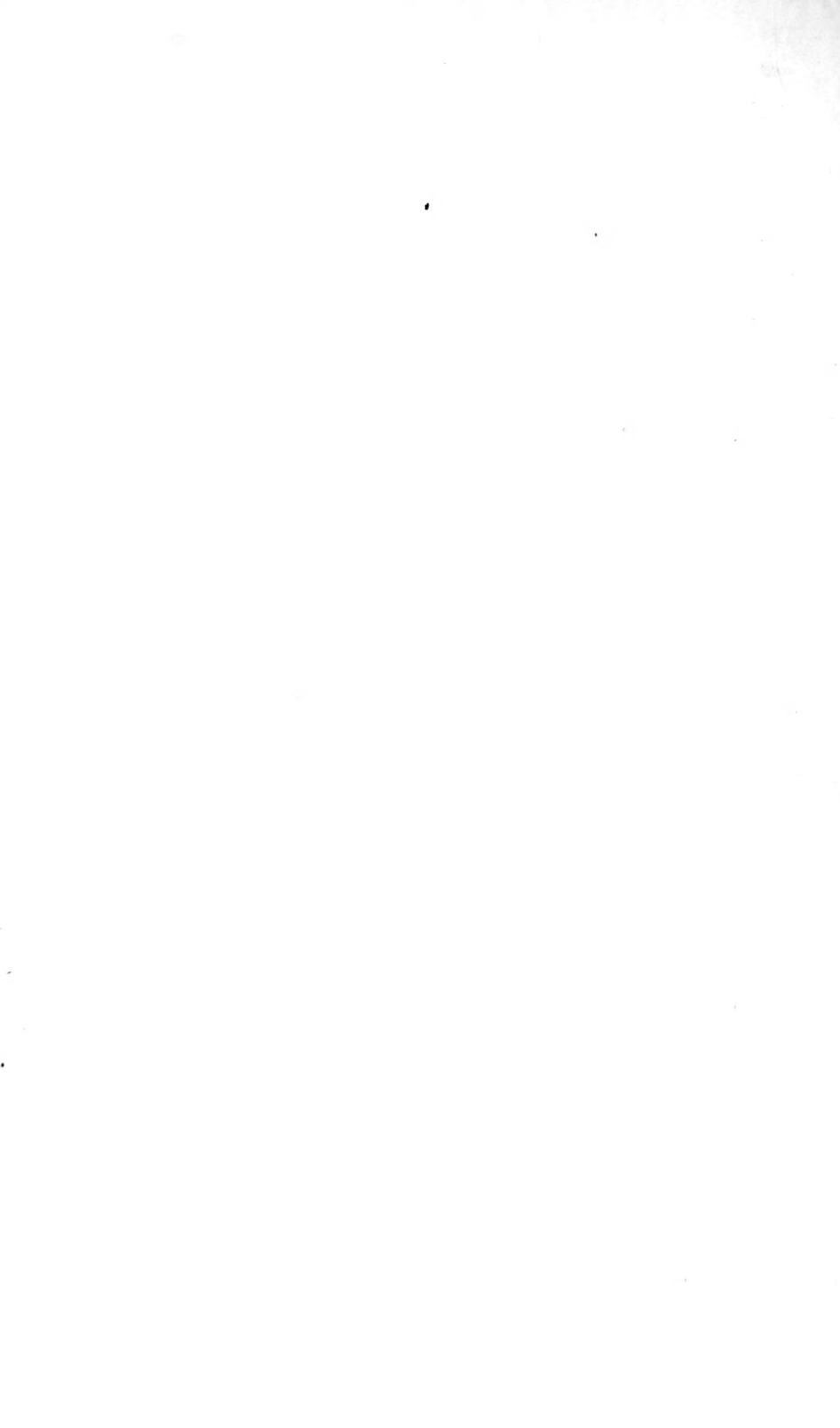
During the past two years the Division of Forestry of the U. S. Department of Agriculture has extended its investigations of commercial trees to the coast redwood of California. For two months in the summer of 1899, and four more in that of 1900, field parties have been gathering information, and by the spring of 1901 the practical results will be published in a bulletin of the Department.

The purpose of such a study as this is primarily to furnish a basis for scientific lumbering. Suppose an owner to have the intention of logging his forest without impairing its productive capacity. To do so he would have to know all the habits and requirements of his trees. He must know how they reproduce themselves in different situations, what are the soils, slopes, and elevations on which they thrive best, how much light they need or will stand, and, most important of all, exactly how much wood per acre they are everywhere producing. These and other points a man must thoroughly understand before he can determine whether conservative lumbering with a view to continual crops will pay. Hitherto such management has not always been possible in this country, for the reason that high taxes and low prices have often made it imperative to realize immediately on the full value of forest property. Certainly in the redwoods few millmen could have done otherwise. But the time is near when not only the need for water supply, but the scarcity and value of lumber, will make forest



VIRGIN REDWOOD NEAR CRESCENT CITY (SIX HUNDRED TO A THOUSAND YEARS OLD).

(By courtesy of the Division of Forestry, U. S. Dept. of Agriculture.)



economy both urgent and profitable. Then timber-owners will have to have learned what can be expected of their trees; how, in other words, to harvest the annual yield of wood (which is interest at present disregarded) without destroying the forest (which is productive capital at present consumed).

To acquire this knowledge of the redwoods was somewhat difficult. As most Californians are aware, the trees are very ancient. Even those standing to-day began to grow hundreds of years ago, and, being almost fire-proof, have lived on to extreme old age. Mature trees lingered, young ones were retarded, and in the dense timber that resulted, growth came to be abnormally slow. Thus most virgin redwood is long overmature, and ought long since to have been cut. Once logged, it will be gone forever; for no one will wait for its like to grow again. So it can easily be seen that while the study of old growth might reveal the general habits of the tree, it could furnish small hint of what was to come under the altered conditions of cut-over land. Any prediction of that nature would have to be based on so-called second growth—the suckers by which the old trees perpetuate themselves. But here came in another difficulty. There was no second growth to be found which had reached its culmination, either in height or diameter, and very little which had reached a marketable size, the trouble being that no land now bearing trees has been logged long enough to have produced it. Nevertheless, in several localities on the coast there are stands of redwood sprouts from thirty to forty years old, from some of which box-boards and spiling have already been taken out, and these, being salable, are large enough to give figures of immediate usefulness.

One such tract near Crescent City became the first subject for study. The land where it stood had been logged and burned in 1873-74, yet at the time when the trees were

examined, twenty-five years afterward, they were from sixty to eighty feet in height, and from twelve to eighteen inches in diameter, and thick enough to shade the ground entirely. Four hundred and fifty of them were cut down and measured, and their annual rings were counted at intervals of six feet all the way up the trunk; and similar stands—one younger, the other older and considerably larger—were visited and similarly treated at Trinidad and Eureka. In each case it was ascertained as definitely as possible how the land had been left after logging, how used thenceforth, and how often burned and when; all of which facts, when compared with the present condition of the forest, its soil, situation, moisture, go to show how the redwood sprout develops. Then, from the measurements and ring-countings come the fundamental deductions about future yield. The volume of each tree is carefully computed and several hundred of them averaged; the results are classified with the corresponding ages obtained from the annual rings, and the whole set forth as a table, showing for stated periods of years just how many feet B. M. are produced per acre. It may further be shown in tabular form how high a forest of a certain average diameter would be, how high one of a given age, and what is the per cent. of bark, heartwood, or clear length on either basis. In short, the rate of development in merchantable timber can be computed and tabulated from these data, and put in shape for financial calculations of perfect soundness.



REDWOOD SUCKERS NEAR EUREKA—ABOUT THIRTY YEARS OLD.

(By courtesy of the Division of Forestry, U. S. Dept. of Agriculture)



THE MAZAMAS ON MOUNT JEFFERSON.

BY EDWARD T. PARSONS.

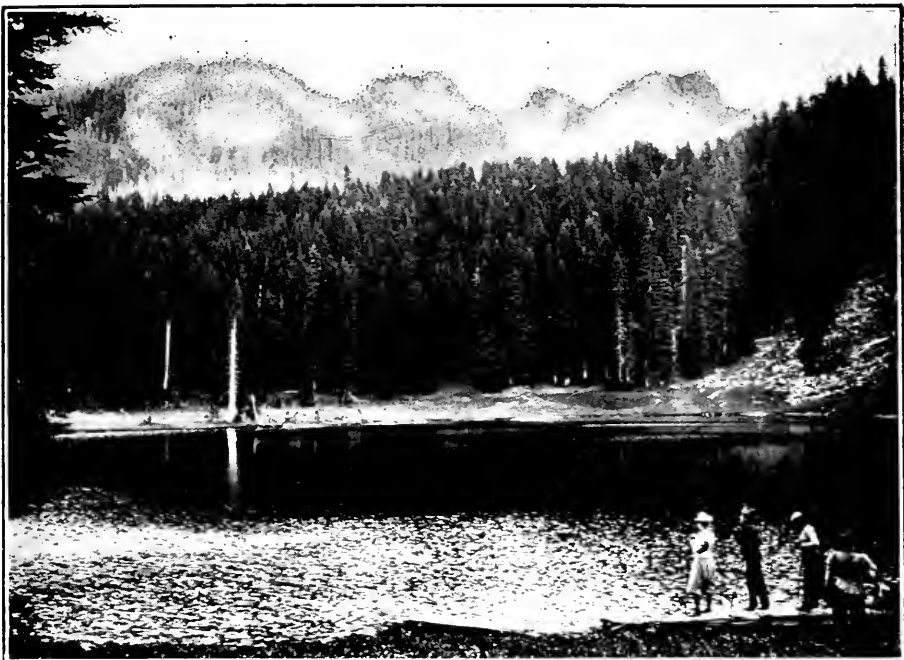
Midway between Mt. Hood and the Three Sisters in the Cascade Range in Oregon is a precipitous peak of volcanic origin 10,567 feet in altitude—Mt. Jefferson (latitude, $44^{\circ} 46' 26''$; longitude, $121^{\circ} 48' 59.9''$). It is surrounded by beautiful ridges, valleys, and cañons in which are gem-like lakes, sparkling brooks, the beginnings of rivers, which are broken by most beautiful cascades and waterfalls. The rivers and lakes are alive with trout; deer and mountain sheep are not scarce.

In this inviting region, the Mazama Club of Portland enjoyed its annual outing and mountain-climb for 1900, with the Peak of Jefferson as the summit to be conquered. It was the privilege of the writer to accompany the expedition. We left Portland on Monday, August 6th, and returned to Portland on Saturday, August 18th.

The party took the Corvallis and Eastern Railway from Albany to the end of the track, at a place called Detroit, where we camped on both sides of the Santiam and enjoyed the good things of the commissary. The early evening was showery, but later it cleared, and we lay beneath the stars, in our blankets, and were lulled to rest by the murmur of the rippling waters. The next day we began our tramp on the newly graded right of way of the railroad. This led us along the banks of the Santiam, a beautiful river with charming vistas, sparkling rapids, and with deep, green pools where it rested at times between its rocky banks.

Leaving the Santiam at the end of the grade, we passed through miles of magnificent forests and made our next camp at Peasley's, a deserted home in a glade, where the occupant had by deep ditch-digging drained a small lake, leaving a meadow. Here "Johnny," the burro, delighted in the pasture. After the fifteen-mile tramp from Detroit we all enjoyed the hearty meal the commissary prepared and a pleasant evening about the camp-fire, where tales of previous trips were told and plans laid for the morrow.

The sonorous "hee-haw" of Johnny roused the camp betimes during the morning. After an early breakfast we started in the cool of the dawn for a sixteen-mile tramp to Hunt's Cove. The trail over Minto Mountain, a steep climb of 2,500 feet, was chosen instead of what afterward proved to be a better route, by way of Pamela Lake. As we left the shade of the forest and came to the precipitous, fire-scarred side of Minto, the heat became oppressive, and it was a weary but not discouraged crowd that straggled into the sheep-camp on the summit, where a delightfully cool fire-embowered spring gave invitation to rest and luncheon. Here we made tea and ate the cold luncheon we were carrying. The party decided to await the pack-train at this place, but five of us concluded to go on toward Hunt's Cove to photograph in the favorable light of the afternoon. We left the rest of the party at Camp Minto to follow with the pack-train and commissary later in the day. On coming to the sharp rocky ridge—the Wizard's Backbone—east of Minto, we enjoyed a magnificent view of Jefferson, and took various photographs of the mountain with the clouds playing and changing about its summit. Following the ridge, we looked down into the steep-walled Hunt's Cove about dusk, and made camp half-way down its rocky side near the bubbling waters of a fine spring under the tall spruces. Here we met a party of three gentlemen from Salem who were going to climb the mountain and join us on the summit.



LAKE AND WALLS OF HUNT'S COVE.



LOOKING SOUTH FROM SNOW-FIELDS OF MT. JEFFERSON.

(The "Three Sisters" on the left—"Three-Fingered Jack" in the middle distance.)



After dinner we sat about a cheerful camp-fire, and then retired for the night. Toward morning, as the camp-fire burned low, I rose to replenish it. Walking out to an opening, I enjoyed a night-view of Jefferson that showed its rugged outline against the azure depths of the sky, impressing me with its forbidding strength and grandeur. While standing in the glade the faint murmur of distant cascades stole through the silent depths of the forest. The bright stars twinkled, the pale moon flooded the scene with her mellow light, and the call of a night-bird stirred the stillness of the atmosphere. With a roar and a crash, a high rock fell from a neighboring crag; the camp-fire flickered on the forms of the sleepers. It was a scene of weird and ineffable beauty. I was moved to pity those whose habits chain them to an unceasing round of toil or business care and who never see Nature in her grandly beautiful forms. I bowed my head in silent homage to that Supreme Creator who raised these mountains, carved these valleys and cañons, clothed them with the richest embellishments of foliage and flower, and gemmed them with these pearly lakes threaded on silvery, sparkling streams. I seemed to hear the voice of Nature saying to all: "Come hither, ye weary, ye careworn, ye toiled. Rest ye, and gather happiness and contentment for the present, inspiration and hope for the future."

The rest of the party not having arrived, we had concluded something had delayed the pack-train, and that they would come on and try for timber-line the next day. So, with an early breakfast, we started to pioneer the way and look up a good camp as near the last timber as possible. Down the steep slope to Pamela Creek we struggled, through tangled brush and windfalls, missing the easy trail to the cove, and crossing the creek on the rocks and logs. We slowly toiled, with our heavy packs, up the steep sides of the cañon to the north side of the cove; thence up the

steep burned side of the valley, till on its overhanging brow we overlooked the cove and saw for the first time its fascinating beauties. Below us were grassy meadows in benches fringed with firs, where numerous lakes reflected the crags which walled in the valley. All was embellished with banks of wild flowers.

Beyond the opposite walls of the cove we saw Three-Fingered Jack, the Three Sisters, and Iron Mountain. To the southwest was seen Marion Lake, ten miles away, nestling in its fir-fringed banks. Farther to the westward the Wizard's Backbone, Grizzly Peak, the Three Pyramids, and also Minto Mountain, where we had left the party the afternoon before. Right below us lay Pamela Lake, its unruffled surface mirroring the beauties and grandeur of its surroundings.

After a council, two of the party visited Pamela Lake to fish; two went up to timber-line to select a camping-place; while I started a signal-fire to show the party following our location. About noon, with the aid of glasses, we saw the pack-train and party four miles away, coming along the sharp edge of the Wizard's Backbone from Minto Mountain to the cove. Putting on green boughs, a signal-smoke was made that was seen by the party and cheered them on. The clouds began to gather, and distant mutterings gave notice of a thunder-storm that soon breaking presented with its bright flashes and echoing reverberations a grand anthem of heavenly orchestration. While watching, we saw the party go into camp below, beside Pamela Creek, beneath tall firs. Later, we five descended to the cove and rejoined the party.

Upon comparing notes, we learned that those remaining at Minto Camp waited in vain the day before for the pack-train and commissary, and would have been supperless had not a hospitable sheepman (W. A. Foley) given them a fine sheep, which was broiled on alpenstocks and enjoyed

with true mountain appetites. The next morning the dilatory packer came along with the commissary, and the journey to the cove was resumed.

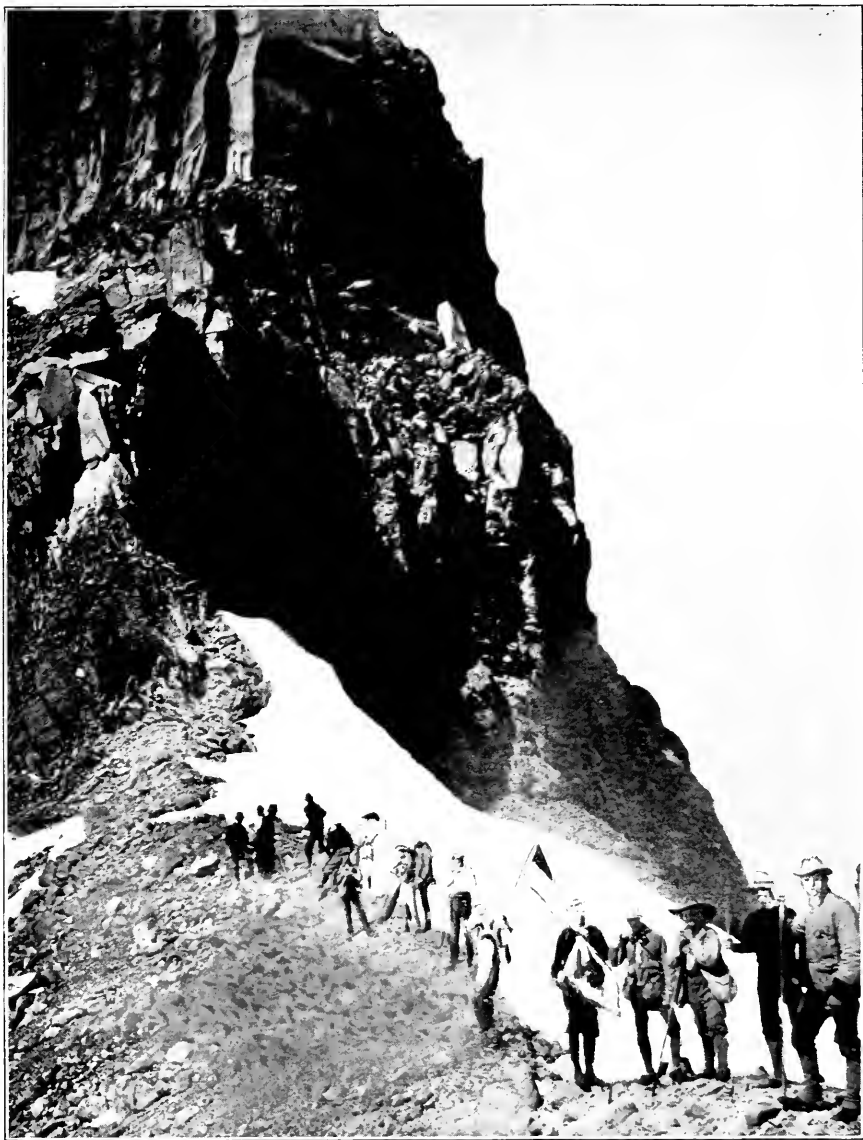
This was Friday. The climb of Jefferson had been scheduled for Saturday, but the freshly-fallen snow on the summit and the fatigue of the party being taken into consideration, it was voted to postpone the climb until Monday. Saturday was filled with different excursions about the cove. Some went to the rim to photograph and botanize; and others to Pamela Lake, where a party of three caught 268 fine trout in about three hours' fly-casting. A party photographed the various cascades and falls in Pamela Creek between the cove camp and the lake — beautiful gems set in brightest and most luxuriant green foliage, moss, and wild flowers. Sunday was a quiet day. Many a glance of silent contemplation was directed to the rugged rock-ribbed peak before us. At noon the party assembled to listen to addresses by several members of our party. The inspiration of the magnificent surroundings aroused them to their best, and none of us will forget the exalted themes and the eloquence of the speakers. Then, as was most fitting on the eve of a great and important undertaking, we united in an invocation to the Supreme Architect of the Universe for safety and guidance on the morrow. In the afternoon most of the party went on up to timber-line for an early start on the next day's climb, while some of us remained in camp to make the entire climb in one day.

We started at dawn after an early breakfast and followed the trail of the advance party up out of the cove and through the timber, which constantly grew sparser. Here and there were little grassy meadows where one instinctively looked for deer. We followed the trail until we arrived at the camp made by the party at timber-line. Thence, keeping between the ridges, we finally overtook the party on the first snow-field.

The first part of the climb was uneventful. We traveled slowly with frequent rests, enjoying the magnificent views to the southeast, south, and southwest as they unfolded before us upon reaching the higher elevations. We finally approached the summit of Jefferson, where the climb became steep and difficult. Large loose boulders made extreme caution necessary, lest once started they should strike down those of the party following. Several of these great boulders were started down the mountain. At first they rolled slowly, then faster and faster, till they fell into a crevasse, or with giant leaps dashed to a final resting-place two miles below, or, striking a rock, exploded and dissipated in dust and fragments.

The summit consists of a double jagged pinnacle, which has seldom been climbed. It is about three hundred feet high, with nearly vertical sides. The base of this pinnacle was reached by half-past one by nearly all of the party, including four ladies, who were mountaineering for the first time. We went prepared to climb it, but the snow-slope on the west that has to be crossed to reach a way up the rock was so steep, wasted, and soft that the officers of the club decided that it was too hazardous, though one of the party did climb up part of the way. This pinnacle can be climbed earlier in the year when more snow lies on the slope; but then it must be early in the day, before the sun softens the snow-slope, making it liable to slide. To cross the snow-field, steps must be cut in its surface on a level across its face to the north side, where the climb up the broken rocks is possible.

After holding a business meeting of the club for the election of new members qualifying on the trip, the return to Hunt's Cove camp was made in detached groups. The first of us got into camp by 5:30 P. M., after an exhilarating descent over rocks, loose earth, and snow. Part of the way we had delightful coasting over the steep snow-fields.



SUMMIT OF MT. JEFFERSON—AT THE BASE OF THE PINNACLES.

We all had studied carefully, from our elevation on Jefferson, the pass out of the cove to Marion Lake, and the general direction to be taken through the trackless forest to reach the place which was to be our next sojourn. By 5 o'clock next morning straggling parties were on their way over the pass. The last of the party left the cove at 10 A.M. After final farewell photos from the south wall of Hunt's Cove, we made our way by deer-trail, and with the sun to give us our general direction toward the lake. Three U. S. Government forest rangers (Messrs. Henness, Heseman, and White) led the way to a delightful campground near the shore of Marion Lake under the tall spruces. Here, beside an ice-cold, rippling brook, we made our camp, calling it "Mazama Camp."

Several days were spent in "Mazama Camp." Rafts were built and launched on the lake, and from them many a fine large trout was landed. Photographing tramps were made about the region, and beautiful negatives secured of Marion and Linn Falls, just below the lake in the Santiam, and of Gatches Falls, three miles below.

Those were delightful days and nights at Marion Lake. At last, one Friday morning, with many regrets, we broke camp and tramped down the Marion Lake trail about sixteen miles, visiting Gatches Falls beside the trail and admiring the noble forests of the region, to Peasley's again, where we held our final camp-fire. Saturday morning early we were on our way, and caught the train at Detroit for Albany; thence scattering to our homes in various directions, with muscles hardened, flesh solid, and clear brains to resume the regular routine of life.

WAGON-TRIPS TO THE SIERRA.

BY LINCOLN HUTCHINSON.

Broadly speaking, there are two classes of mountain tourists—one seeking adventure; the other, mere recreation. To the first class, pack-animals and pioneering in the farthest wildernesses alone have any charms; to the second, repose and scenery are sufficient rewards. To the one, hardships and privation are mere incidents which add zest to the pursuit; to the other, they are evils to be reduced if possible to a minimum.

To any one of the truly adventurous class, the mention of the word “road” or “wagon” is an affront, and even “trail” is treated condescendingly. He is the true mountaineer, and will naught of the ordinary modes of locomotion or the paraphernalia of civilization; the very thought of “easy” camping is tabooed.

One of the avowed aims of the Sierra Club is to rouse and spread popular interest in the Sierra—to bring the mountains nearer to the people, and to stimulate the love of them. The public is not, however, composed wholly of mountaineers. Many there are who lack either the opportunity or ability to take the longer, harder, more adventurous trips, yet who are at heart as true lovers of nature as the mountaineer himself, and would, if opportunity were given, learn to worship the Sierra as truly as he. It may, therefore, not be amiss to devote a few pages of the BULLETIN to pointing out to such as these, one of the ways in which, with less trouble and far more comfort, they may

gain access to the magic world of the High Sierra and be received into the charmed circle of mountain-lovers.

I have said *High* Sierra advisedly; for to feel the real beauty of our mountains, to enjoy those features which are really characteristic, one must go *high*. The lower slopes are wonderfully beautiful, to be sure; but to get into the truly Sierran world one must go farther, beyond the lower foothills, beyond the gloom of the forest belt, and learn to know the great new world of granite, snow, and sunshine which lies above them.

It goes without saying that any trip into this higher world must involve a certain degree of privation and hard work. It is necessary to camp, and one cannot in camp enjoy all the luxuries of home. With proper management, however, it may be possible to avoid some of the worst discomforts, and there is no better way to do this than to take advantage of the wagon-roads which, in a few places at least, pierce the range and make accessible some of the most beautiful sections of the mountains. A stout wagon with a reliable pair of well-built horses will go a long way toward smoothing over some of the difficulties of camp life. It is far easier to sit quietly on a wagon-seat and be hauled up the grades than it is to walk; far easier to pack provisions and accouterment in a solid wagon-bed than to adjust them to the back of even the most docile mule or burro.

For the convenience of those who may be contemplating trips of this nature, the following list of the more important Sierran roads has been prepared. Only such roads as run east and west across the main ridge of the Sierra have been included, though mention is made of some of the connecting north-and-south roads which are found on either side of the summit. The Shasta and Modoc regions have been purposely omitted, because the mountains there, with the exception of a few isolated peaks,

do not reach an altitude sufficient to give them a truly alpine character. The same remark applies, though with less force, to the whole region north of the Central Pacific Railroad; yet there are so many beautiful trips to be found between Castle Peak and Lassen Butte that it has seemed best to include some of the roads which lead into this region. In a short article it is impossible to give any full description of the various routes; only such items are given as will enable the reader to identify each road on the map, and will give him a general idea of the country to which it gives access.

In each case I have mentioned the most convenient railroad point from which to start, the more important places on the road, the altitude at which it crosses the main ridge, and the principal side-trips which may be made by road or by trail. In some cases, also, distances between principal points are given, and where possible comment is made on the character of the road. The routes are numbered consecutively from north to south.

Road 1. — Redding to Millville; up North Fork of Cow Creek; between Burney Butte (7,880 ft.) and Magee Peak (7,494 ft.); across an unnamed pass (5,000 ft.) to Fall River Mills; thence north to the Modoc Lava Beds, or south to the Honey Lake district. Distance from Redding to Fall River Mills, 83 miles. Stage road, probably good.

Road 2. — Redding to Millville; up South Fork of Cow Creek; across Noble Pass (6,200 ft.) to Lost Creek; thence north or south, as in No. 1 above. Side-trips: By trail, to Lassen Butte; by road, to within about one mile of Cinder Cone.

Road 3. — Red Bluff to Lyonsville; unnamed pass (5,400 ft.) to Big Meadows; thence east to Honey Lake, or south to Truckee. Distances: Red Bluff to Lyonsville, 35 miles; Red Bluff to Prattville (Big Meadows), about 70 miles. Side-trips: By trail, from Big Meadows to Lassen Butte and

Cinder Cone; by wagon, from near the unnamed pass to Soupan Springs (7,700 ft.) on the southern slope of Lassen Butte.

Road 4. — Chico to Butte Meadows; over unnamed pass (6,800 ft.) to Big Meadows; thence as in No. 3 above. Distance: Chico to Prattville, 67 miles. Stage road, good.

Road 5. — Marysville (or Oroville) to Bidwell Bar; over unnamed pass (5,500 ft.) to Quincy; thence north to Big Meadows, or south to Sierraville and Truckee. Distances: Oroville to Bidwell Bar, 9 miles; Oroville to Quincy, 65 miles.

Road 6. — Same as above, to a point a few miles south of Bidwell Bar; thence across an unnamed pass (5,500 ft.) to Gibsonville, to Mohawk Valley, to Sierraville. Distance: Oroville to Gibsonville, 59 miles. Stage road, probably good.

Road 7. — Marysville or Oroville to Downieville, to Sierra City; over Yuba Pass (6,700 ft.) to Sierraville, to Truckee. Side-trips: By trail, to Sierra Buttes (8,615 ft.); by road, to Gold Lake and Sardine Lake. Distances: Marysville to Downieville, 65 miles; Downieville to Sierra City, about 15 miles; Sierra City to Sierraville, 21 miles; Sierraville to Truckee, 26 miles. Stage road, good.

Road 8. — Marysville (or Oroville) via Downieville Road to Forest; up Middle Fork of Yuba River; over unnamed pass (7,000 ft.) to Webber Lake, to Truckee. Side-trip: By road, to Independence Lake; thence, by trail, to White Rock Lake.

Road 9. — Sacramento to Auburn, to Cisco, to Summit (7,100 ft.), to Donner Lake, to Truckee. Side-trips: By road, to Bear Valley, to Summit Soda Springs, to cañon of the Middle Fork of the American River; by trail, south to Tinker Knob (9,020 ft.), Rubicon Springs, etc., or north to Lake Angela, Castle Peak (9,139 ft.), etc. Distances: Sacramento to Auburn, 36 miles; Auburn to Cisco, 56

miles; Cisco to Summit, 13 miles; Summit to Truckee, 10 miles. Road excellent.

Road 10.— Same as above, to a point near Emigrant Gap; thence north to Bowman Lake, to Summit City; over unnamed pass (7,600 ft.) to Webber Lake; thence as in No. 8 above. Side-trip; By trail, to large group of lakes on the South Fork of Cañon Creek (altitudes from 6,500 to 7,000 ft.).

Road 11.— Auburn (or Sacramento) to Georgetown, to Jacobsens, to Gerlé, to Rubicon Springs; over pass (7,300 ft.) to Lake Tahoe. Side-trips: By trail, to Rockbound Valley, Dick's Peak, Desolation Valley, etc. Distances: Auburn to Georgetown, 20 miles; Georgetown to Rubicon Springs, about 55 miles. Road above Georgetown said to be very rough. (This same trip may also be made from Placerville.)

Road 12.— Placerville to Strawberry Valley; over pass (7,400 ft.) to Meyer's Station, to Tallac; thence via Daggett's Pass (7,400 ft.), or via Glenbrook and unnamed pass (7,700 ft.) to Carson. (It is also possible to get, by a very rough road, round the eastern side of Lake Tahoe, via Marlette Lake to Tahoe City and Truckee). Side-trip: South from Meyer's Station, over Luther Pass (7,800 ft.), through Faith, Hope, and Charity Valleys, to Blue Lakes. Distances: Placerville to Tallac, about 65 miles; Tallac to Meyer's, $8\frac{1}{2}$ miles; Meyer's to Blue Lakes, about $31\frac{1}{2}$ miles. Road from Placerville to Tallac good; from Meyer's to Blue Lake rough in places.

Road 13.— Placerville to Grizzly Flat; to Corral Flat (or Ione to Jackson, to Volcano, to Corral Flat) to Silver Lake; over Carson Pass (8,600 ft.) to Faith Valley (joining here the road from Meyer's to Blue Lakes mentioned in No. 12 above) to Markleeville. Side-trips: By road or trail, to Blue Lakes; by trail, to Round Top (10,430 ft.). Distances: Placerville to Grizzly Flat, 27 miles; Grizzly

Flat to Corral Flat, about 25 miles; Corral Flat to Silver Lake, about 10 miles; Silver Lake to Faith Valley, about 15 miles; Ione to Volcano, 24 miles; Volcano to Silver Lake, 40 miles. Road for ten miles above Silver Lake said to be very rough.

Road 14.—Milton to Murphy's, to Calaveras Big Trees, to Blood's, to Hermit Valley; across unnamed pass (8,600 ft.) to Markleeville. Side-trips: By road, to Blue Lakes; by trail, from Calaveras Big Trees to South Grove; from Blood's to the Dardanelles (8,500 to 9,500 ft.); from Hermit Valley to Raymond Peak (10,075 ft.), to Highland Peak (10,955 ft.), to White Cañon of the East Carson River, etc. Distances: Milton to Big Trees, 47 miles; Big Trees to Blood's, 24½ miles; Blood's to Hermit Valley, 12½ miles. Road good, except a few miles west from Hermit Valley.

Road 15.—Sonora to Sugar Pine, to Strawberry, to Eureka Valley, to Baker Station; over Sonora Pass (9,624 ft.) to Bridgeport, Bodie, and Lake Mono. Side-trips: By trail, from Baker Station to Kennedy Lake; Upper Valley of the West Walker River, Leavitt Peak (11,575 ft.), Kennedy Peak (10,677 ft.), etc.; from Sonora Pass to Sonora Peak (11,429 ft.), White Mountain (11,321 ft.), etc.; from Leavitt Meadow up West Walker River to the very wild and beautiful region at its head-waters and to Tower Peak (11,704 ft.). Distances: Sonora to Sugar Pine, 18 miles; Sugar Pine to Eureka Valley, 48 miles; Eureka Valley to Sonora Pass, about 15 miles. Road good. One of the finest of the wagon-trips.

Road 16.—Sonora to Crocker's, to White Wolf, to Porcupine Flat, to Lake Tenaya, to Tuolumne Meadows; over Tuolumne Pass (9,941 ft.) to Tioga. Side-trips: By wagon, from Lambert's Soda Spring to upper end of Tuolumne Meadows, just north of Mt. Lyell (there is no road here, but it is possible with care to drive a wagon the whole distance); from Crocker's to Hog Ranch, and thence

by trail to Hetch Hetchy; by trail, from near White Wolf to Harden Lake, to Smith Peak, overlooking the Grand Cañon of the Tuolumne; from near Porcupine Flat to Eagle Peak and Yosemite Valley; from upper end of Tuolumne Meadows to Mt. Lyell (13,120 ft.), Mt. Ritter (13,156 ft.), etc.; from near Tioga Pass to Mt. Dana (13,050 ft.), to Mono Pass (10,600 ft.) and Bloody Cañon; from Tioga to Saddlebag Lake, Mt. Conness (12,550 ft.), etc. There are also other beautiful and interesting side-trips too numerous to mention here. Altogether this is probably the finest of the wagon-trips. The road is very rough in places, but not impassable. Distances: Sonora to Crocker's, about 40 miles; Crocker's to Tuolumne Meadows, 44 miles; Tuolumne Meadows to Tioga, 12 miles.

In concluding this brief sketch it may be well to add a few suggestions in regard to outfit. The horses should be strong animals, built for endurance rather than speed; they should be accustomed to the pack-saddle, so as to be of service on the side-trips. The wagon should, of course, be as light as possible, but strength should not be sacrificed to lightness, for on any but the regularly traveled roads the wagon will get many a hard knock. A pack-saddle, for use on side-trips, an ax, and a small cross-cut saw, for cutting through fallen trees (in the case of the less-frequented roads), should also be taken. For the rest, the outfit need not differ from the ordinary camping paraphernalia. A little practice will teach one what to take and how to take it.

A single word of caution to the beginner may be necessary: Be content to travel slowly. It is impossible to make fast time on our mountain roads, and, indeed, after passing the foothills there is no need of hurrying. There is so much to be seen and there are so many side-trips possible that it pays to take one's time. Move leisurely from place to place; pitch camp for a day or more at promising spots;

explore the country as you go; fish and hunt where possible; climb the commanding peaks, if you care to climb. A trip of this sort will open up a whole world of new possibilities to you, and will do much to gloss over the necessary hardships and discomforts.

THE BIG BASIN.

BY F. L. CLARKE.

The northwestern part of Santa Cruz County is, topographically, peculiar, in that it is cut off, as it were, from the broad valley of the Lorenzo River, and has a watershed of its own.

The Lorenzo — rising in the angle formed by the northerly-trending range of low mountains forming the eastern boundary of the county and a westerly-trending offset — flows southward, draining practically the whole county except the northwesterly area spoken of. This forms what is known as "The Big Basin," from the fact of its being divided from the Lorenzo by a long spur putting off southerly from the westerly-trending offset. This spur terminates in the high, flat-topped hill known as "Ben Lomond," the western flanks of which reach the ocean beach.

The Big Basin comprises an area of between 15,000 and 20,000 acres. On the north, east, and south, it is environed by hills; on the west, bounded by the ocean. In its northeastern part, near where the southward-trending spur commences, four or five small watercourses receive the drainage from the steep westerly slopes, uniting soon to form Waddell Creek, that, flowing southwesterly, drains the northern and central part of the basin; while Scott's and Big Creeks, lying farther south, carry off the water from the southern portion of the area.

As might be expected from its location and formation, the basin receives an abundant supply of moisture; and this



THE "BIG BASIN," SANTA CRUZ COUNTY.
(Map by F. L. Clarke.)



has favored the growth of a magnificent forest, made up of grand redwoods, beautiful chestnut- and live-oaks, madroños, laurels, manzanitas, maples, alders, and willows, besides many shrubs—*all* distinctly Californian, all beautiful.

Of these the redwoods first attracted the attention of lumbermen forty years ago. Then a Mr. Waddell, the pioneer settler near the mouth of the creek named after him, built a small mill some five miles up from the ocean beach, connected it by a primitive wooden tramway with Año-Nuevo Point, and cut out a good deal of the timber in his neighborhood. Lumbering was being done at that time east of the dividing spur on the Lorenzo, and, later, on Boulder Creek. Waddell soon reached a point in the lower western portion of the basin where it ceased to be profitable to cut farther, and logging stopped in the basin, though the felling of redwoods for shakes and the stripping of the chestnut-oaks for their bark have been continued to the present time.

Realizing the fact that in time more modern methods would make available the redwood in the basin, the forest-covered land was largely taken up. In some instances, this was done by actual settlers; but by far the largest portion—practically *all* the timber-land—was secured for future operations, the holdings now being substantially as follows:—

Searles's holdings	1,800 acres.
Burling Estate's holdings	880 "
Pescadero Lumber Company's holdings	2,400 "
Partridge Estate's holdings	760 "
Individual holdings (about twenty).. . . .	6,400 "
Vacant (not being good timber-land).	3,660 "

Making a total of 15,900 acres.

This is out of a possible 20,000 acres, the balance being largely under the control of the Big Creek Water Company, supplying Santa Cruz with power and lights.

(One of these large areas was secured by placing upon it "Sioux scrip,"—i. e. certificates issued by the U. S. Government to Sioux Indians in part payment for lands taken from them, each certificate entitling the holder to take up one hundred and sixty acres of public lands not otherwise occupied. Whether this privilege was intended to extend to any holder, and applied to any land, is a moot question yet.)

A description of the Big Basin, if one sees it as the writer has, while spending much time in exploring it during the past ten years, will naturally commence with the most familiar route into it, that by way of Boulder Creek. From there, at the present terminus of the narrow-gauge railway branching from Felton, a wagon-trip of about eight miles takes one up Boulder Creek to near its head, and thence over the divide formed by the southward-trending spur. During this ride, one sees abundant evidence of what the basin will look like in less than five years, if lumbermen and tanbark-gatherers go on with the work, as at present, of taking out the redwood timber and stripping the chestnut-oaks, as they have, over the whole country traversed.

The wagon-road terminates on the edge of a beautiful "*potrero*"—a natural opening in the forest—forming an ante-room, as it were, to the amphitheater of the basin. This *potrero* is about ten acres in extent, circular in shape, environed by great oaks, hoary with mossy drapery. A thick screen of the California lilac shields from view on one side the broad road lately built to give access to a large area bordering the basin, that has been recently cut over. Across the grassy opening, sloping gently to the south, a trail leads through a forest of madroños, oaks, and laurels, to the edge of a picturesque lagoon, whose mirror-like waters are as unexpected in that locality as they are beautiful.



"THE LAGOON" ADJOINING "OAK POTRERO," BIG BASIN.

Photograph by F. L. Clarke.



Leaving this lagoon, one recrosses the *potrero* and follows a trail leading to a favorite camping-ground on the banks of one branch of the Waddell. The pretty stream finds its way down a narrow valley set thick with noble redwoods, and a half-mile below the camp the clear, cold waters dash and tumble over a series of rocky ledges, in sparkling miniature cascades, the spray from which keeps green a thick mantle of delicate "five-fingered" ferns, whose graceful fronds are reflected in the glassy pool below, where trout abound.

Retracing one's steps to the camping-ground, the stream is crossed and a good trail leads windingly up the western ridge. The top of this divide is soon reached, and then the path leads down along the ridge, winding in and out of numerous "draws" opening into the basin. Down this delightful path one walks—or rides—for some two miles. One feels no fatigue, for the descent is easy, and there are constantly opening to the view glimpses of the bosom of the broad valley below. Through shadowy vistas, formed by trees of every size and shape and foliage, there is caught the sheen and sparkle of the creek below; overhead, the mass of branches and leafage is broken to afford other glimpses of the deep-blue sky; the thickly fallen leaves beneath one's feet form an elastic carpet; while the clear, cool air is full of piny, woodsy fragrance.

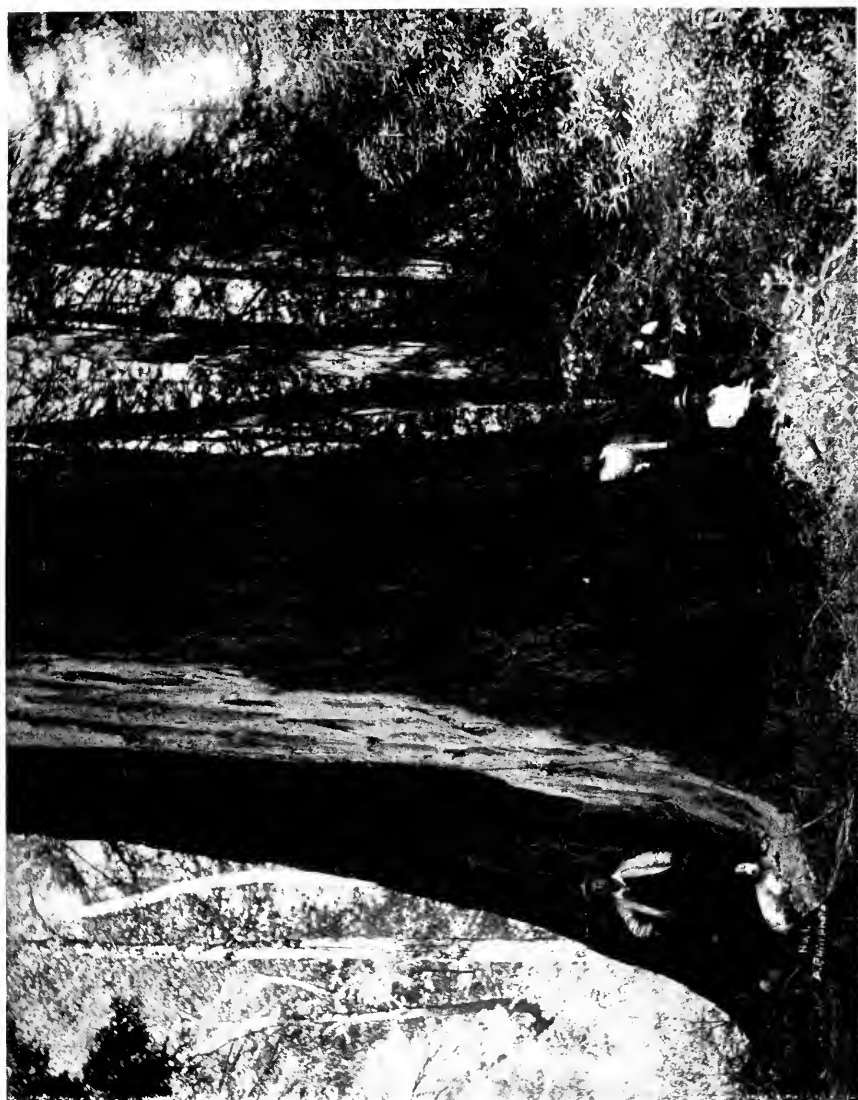
Passing on, one is struck with the variety exhibited in the forest growth. There are grand old pines and redwoods and the chestnut-oak in the lower levels. Fine madroños become conspicuous higher up. Then come the manzanitas, ceanothus, laurels, and live-oaks. Peering above the forest are seen the tops of more barren hills, but these have their crown of trees, the "knob-cone" pine finding there congenial soil. The yew, known as the "California nutmeg," has its home in the deeply shaded valleys, with grand specimens in Scott's Creek Cañon. In

fact, so varied is the forest growth that it may be said the Big Basin is the home of a greater variety of trees indigenous to this coast than any other known area. As a natural arboretum of unrivaled beauty, it should be preserved.

The trail, winding now amongst the superb redwoods clustered thickly in the heart of the basin, leads to an open area — a mid-forest *potrero* — where twelve years ago the writer “assisted” in the building of a snug cabin, now partially in ruin. All about this area are notable trees — the “Giant,” the “Four Brothers,” the “Mother of the Forest,” the “Fallen Chief,” the “Natural Bridge,” the “Chimney,” and others, each and all grand and curious. They stand in solemn grandeur as they have stood for centuries; they are the last of their race; are within a short day’s journey from the coast cities. Their dwelling-place is easily accessible at all seasons of the year; they are matchless in size and stateliness; they are amongst California’s unique natural attractions the grandest and noblest!

Leaving them in their silent majesty, one follows the trail over the gently rounded, still forest-clad slopes, through the “Deer Park,” where, amongst dense clumps of ferns, ceanothus, manzanita, and wild huckleberry, bucks, does, and fawns find shelter. Down along the banks of the sparkling Waddell, crossing it at frequent intervals by shallow rippling fords, the way leads on to the “Old Mill.” Here a northern branch of the stream comes in, and from this point to the lagoon at the ocean beach, some five miles, salmon and salmon trout abound, while up on the north branch are dashing falls and scores of quiet pools in which the gamy trout are found.

Gradually, as one nears the lagoon, the valley widens. Signs of former cultivation are met with; the line of hills on the north draws nearer; one comes upon “a road,” and then a grassy meadow-land, beyond which is seen the line of surf, where the ocean beats upon the sandy bar. Across



"THE GUARDIAN OF THE GROVE."

Photograph by A. P. Hill

the broad mouth of the creek is thrown a long bridge, and traversing it to and from Pescadero and Santa Cruz on alternate days, one is pretty sure to see the stage that one can take and go north or south to civilization once again.

Soon a railway will be laid into and through this unique ideal region. That railway will be built, temporarily, to carry out from the Big Basin the noble redwood trees, whose last abiding-place is there; the bark of the splendid oaks, that have no equal in beauty in the world; the madroños, willows, and alders, cut into fagots for the powder-mill; and then its worn-out tracks will be left to rot and burn with the other unsightly, worthless débris. Or, it will traverse the basin from Boulder Creek for the purpose of carrying thither yearly and forever thousands and tens of thousands who seek there health and recreation, each one the better for having sojourned for a while in "God's own temple" — all praising the noble sentiment that will, it is hoped, preserve intact the wondrous beauties of the Santa Cruz Big Basin.

THE RE-AFFORESTING OF THE SIERRA NEVADA.

BY GEORGE HANSEN.

The Water and Forest Association has been formed upon a wide and firm base which augurs well for the noble purpose for which it was created — the preservation of the forests and the water supply on our coast. The alarming manner in which our hillsides are drying up and the wasteful slaughter of the forests are so evident to all observing citizens that the time was ripe for the forming of the association. The older Sierra Club may justly accredit itself with an influential share of having brought about the realization of the sad condition of things. While its objects are more of an ethical nature, we see plainly that we are much in need of intimate fraternization with this new society. WITH EVERY LEAF OF A TREE FELLED IN THE FOOT-HILLS, A SNOWFLAKE LESS WILL CLOTHE THE SUMMIT, the exploration of which we have undertaken with so many gratifying results. We must lean on the strong support of the Water and Forest Association and extend our enthusiasm to the hard labor before it.

In almost all descriptions of trips into the Sierra the narrator does not introduce us to the pines until he has reached the cooling shade of those which still remain in their virgin condition. This must change. We must no longer hurry through those hills which impress us as barren and uninviting. We must remember that these very districts once were clad with pine and oak. Creeks and branching ditches made this region once a pleasant country, not only

during our so-called winter and the flower-bedecked spring-time, but also during summer. It is with difficulty that now in the warm months the traveler finds water sufficient for team and cooking. The stockman, whose paradise this region is in winter and spring, would not be able to hoist sufficient water out of his deep well in summer to water more than his spring-wagon team.

While afforestation must be left to men trained for and permanently employed in such profession, we of the Sierra Club should become intimate with the modes of procedure. The fields of action may be divided into two zones: the lower, from the valley line to the sugar-pine belt, is the zone of reconstruction; the upper, from the sugar-pine belt to the summit, is the zone of protection. Only limited areas of the latter have fallen into the hands of settlers and the solution of the problem before us is simple. The fundamental rule must be: Withdraw from filing every section not yet dealt out; organize a system of protection for them; and add all of those lands which the timberman considers as worthless after he harvested his crop of lumber. As long as any seed-bearing specimens remain in the surrounding country, nature will establish a new forest in a short period.

The lower zone, the zone of reconstruction, offers more serious problems. It is the territory least mentioned when the Sierra is spoken of, and it is the very one requiring the closest attention. Its ridges are washed bare, its cañons filled with débris, its soil burned hard, and every vestige of humus and forest-sponge is gone. Its agricultural interests are limited, and its vast ranges are held by stockmen for winter pasture. We must compromise with these settlers. They must surrender the slopes and ridges and those stretches which we require to round out our holdings, and we must leave them the good pasture-lands and orchard-grounds.

To accomplish any purpose whatever, the burning over

of the brushy ranges has to be arrested, once for all. We must devise means for defense; for the match will be lit and the fire sweep in unrestricted fury in years to come as in years past. The stockman seeks the assistance of the flames to destroy the scrubby growth which prevents any feed from springing up. We must find means for him to grow pasture and browse. The flames must be kept out of our timber reservations, and, if encroaching, we must have means of checking them. Division of the sections and permanent control are the solutions for this. As to the former, LET EVERY QUARTER-SECTION BE SEPARATED BY A THREE-HUNDRED-FOOT STRIP OF WASTE. Eradicate the shrubbery on it, and enlist your most bitter enemy, the "four-footed locust," the sheep, to keep down the grass on these strips. And as to the control, place your management in hands which are in sympathy with your work and reliable at time of urgent and sudden need. Aside from the forest-rangers, the settler himself must assist us, and it is not difficult to find ways in which a neighborly co-operation could be agreed upon for mutual benefit.

To depict the conditions of the lower zone, the zone of reconstruction, I took a series of about one hundred and fifty photographs at the time when the foliage of the deciduous trees no longer obstructed the view. The five selected pictures herewith reproduced were taken in Amador County, and they are so thoroughly representative of the existing conditions that they apply with equal force to any part of the foothills at a like elevation.

The first picture is a mining settlement at an elevation of 900 feet. What appear to be fair-sized trees are only scrubby black live-oaks and scanty blue pines. Some scattering valley oaks are mixed in, and they are retained to offer some shade and shelter to the grazing cattle. The fairly level land is devoted to hay-growing, and here and there a patch of vineyard is set out. A large piece of grease-



II.



III.



wood occupies a ridge to the left. The once sweet grasses in this area are driven out by the bronco grass, the only one which withstands and thrives under the changed conditions. There is not a drop of water on any of those hillsides during the warm months, whereas twenty years ago many a little spring could be tapped at the base of the ridges. The dry feed which is not eaten by the cattle before the bands start for the high ranges is greedily devoured at time of their return. The few remaining trees fall victims to the ax before any of them have reached even the small growth of fourteen inches in diameter.

The second picture shows a plateau cleared for agricultural purposes. It is located in the yellow-pine belt, at an elevation of 2,000 feet, where once this pine reached a stand of about fifteen trees to the acre. Stumps three, four, and even five feet in diameter, may yet be found where repeated firing has not burnt the pitchy roots. The field in the foreground is still in use for growing hay. The one across the dry creek bed used to serve such purpose, but was later abandoned. The soil was considered rich enough to start an alfalfa-field, and irrigation was instituted with the waste water from a near-by mill. This irrigation started small cuts, and as years passed by they offered to the heavy rains ready gullies, till the ground became thoroughly cut in hundreds of washouts. Now, after only eight years of neglect, a man could hide standing in the deepest places of any of them. This land is worthless for agricultural purposes, and the reclamation for forestry offers many obstacles. What is brought about here is repeated at every abandoned wood-road throughout the mountain. The rainfall, once absorbed and slowly shed by the forest-sponge, is now carried off in torrents through just such gullies as these. It is needless to mention that the best of the soil is washed valley-ward, and that it is the sterile gravel and rock which remains at the spot.

Picture No. 3 shows a characteristic composition in the region about the 2,500-foot belt. Here it was where the richest mining-claims attracted large and spasmodic settlements. Land was cleared for fields, and orchards were set out. The tumbled-down bridge in the foreground shows how the hydraulic miner followed the gold-bearing channel even under the track of the county road. He despoiled the richest soil and the most valuable sediments. Beyond the washed-out claim stretches a wide field which once showed waves of golden grain. Here it was where gigantic pines were slaughtered for any and all purposes. Water for washing the gravel and sluicing the boxes could be obtained at any time of the year. What a change has taken place! The claim which served as a reservoir, absorbing the winter's moisture, is now drained, and no longer feeds the creek which sprang from it. But, worse than that, it now also dries the entire surrounding country through the deep drainage which it furnishes. Of fences no longer any trace is to be found, and thick and impenetrable manzanitas flourish where pines refuse to take hold. The close observer will notice that the soil has been washed out in deep cuts all along this abandoned field. It will be only a short while when the second-growth pines along the ridge will be corded up to feed the hungry mouth of the furnace.

Picture No. 4 is at the same elevation as the former. It illustrates a hill which six years since was so densely grown with pine saplings that the cattleman had to dismount to chase stock which had disappeared in the thicket. We see what peculiar pranks the fire will play, as some trees remained alive in a fire near which neither man nor beast could breathe. Now millions of manzanita seedlings have appeared, from seed which nobody knows whence it came. The pines will never be permitted to reach the seed-bearing age, and the misled settler who takes up this land for agri-



V.



Photographs by Geo. Hansen.

cultural purposes will find that all humus was devoured in that fire. Under a forester's supervision such stand of young pines could have developed into a promising forest.

Picture No. 5 is from an elevation of 3,000 feet, the range where timbers still suited for mining purposes can be cut. The sawmill-man has passed from ten to fifteen miles beyond where a Government, too liberal to be wise, permits him to help himself, provided he goes to the trouble to file an application. This illustration shows one of those first meadow-flats which the Sierra climber delights to see. They offer a good living and an attractive home to a mountaineer, and no forester would dare to deprive an increasing population of such places of subsistence. But the ranges to the right and left are again the forester's domain, and while every one of the standing trees is ripe for felling, hundreds could remain to seed anew the territory around.

THE DESCENT OF TENAYA CAÑON.

BY GEORGE GIBBS.

On Monday, July 23, 1894, the writer and three friends were camped upon the shores of Lake Tenaya, twenty-odd miles by trail from the Yosemite Valley. We were at the close of a mountain tour which had occupied the whole of our college vacation. Leaving Fresno on the 29th of May, we had tramped across the Sierra, passing through King's River Cañon, and over Kearsarge Pass. Then we had explored the head-waters of the Kern; had spent four hours on the summit of Mt. Whitney; passed through Owen's Valley, until we camped at Casa Diablo. From here we again crossed the mountains by climbing the steep trail through Bloody Cañon. Now we were camping on the site of the old toll-house on Lake Tenaya.

We had been on the road some fifty-six days, and had tramped over 500 miles. Our trip had taken us into some of the grandest and wildest parts of the Sierra. Corbett, one of our party, and I wished, as a climax to the tour, to attempt a dangerous and exciting bit of mountaineering, and so decided upon the descent of Tenaya Cañon into Yosemite Valley. Neither of us knew anything about the cañon, though we had heard that Mr. Muir had successfully passed through it. Had we, before starting, known the extent of the difficulties to be met, we might have hesitated some time before undertaking the trip.

Lake Tenaya is a beautiful sheet of water situated at the head of the stream which supplies Mirror Lake below. To

reach the Yosemite from here by the usual trail, one travels twenty-odd miles; by way of Tenaya Cañon the distance is eight. While Corbett and I made the attempt through the cañon, the other two of our party were to take our mules into the valley by the usual route, and all were to meet below at Mirror Lake.

At six in the morning we started, carrying with us a bite of lunch and about fifty feet of stout rope. We expected to reach the Yosemite by noon,—the others intended to arrive in the valley at four in the afternoon,—so little did we realize what was before us! It took us fourteen hours of the hardest and most trying work to cover the eight miles of cañon.

Leaving Lake Tenaya, we followed along the right bank of the stream. For a mile or two we made our way through thick underbrush and over trunks of trees which lay all about the ground. We were congratulating ourselves on the easy work we were having, when we found that the way was growing gradually steeper and the cañon narrower. The traveling soon became very difficult. The glacier which had passed through the cañon had left the walls and floor in places as smooth as glass. Suddenly the way grew precipitous. There were no signs of brush, and the highly polished rocks were very slippery. Ahead of us we heard the sound of falling waters, and knew that we were approaching a precipice. A precipice it proved to be, and a frightfully steep one. We were puzzled, for if Mr. Muir had gone down the cañon, he had certainly not descended the waterfall before us.

Sliding down on my back thirty or forty feet along the smoothly polished rock surface, I barely succeeded in reaching a small projecting ledge. To this I clung, and looking over saw that a single step would have taken me over the edge of a perpendicular cliff hundreds of feet in height. The sight appalled me. I started back to join

Corbett. Then I realized that, while there had been little difficulty in sliding down, to return was another matter. Unaided, I could not do it. I shouted to Corbett. Fortunately he had the rope, and after two or three attempts threw me an end, and with this help I was drawn up to the higher level where he stood. We were at a loss as to the method of reaching the floor of this chasm before us. Mr. Muir could never have gone down on the side of the stream which I tried, neither could he have descended the bank directly across the stream, for that, we found, was similar to the left side. The only thing to do was to leave the stream and to attempt the descent from a point about two hundred feet to the right. The wall here was broken by two or three broad ledges and several narrower ones. Our only hope seemed to be in dropping from ledge to ledge, by means of the rope, down the steep wall on to the level below. This we finally accomplished, though it took us three hours of climbing, sliding, lowering, dropping, and falling. We would double the rope around some thick shrub or around a sharp-pointed rock which protruded sufficiently, and then, gliding down on the rope, would seek a footing at some point below. Thus, considerably exhausted, we came to the bottom. Here a plunge into a deep, cool pool refreshed us.

For a mile or more we now walked through underbrush or waded through the creek. Wet, tired, hungry, and a great deal less exuberant than in the morning, we trudged along, knowing that to go back now was impossible. With only four biscuits and a couple of cold rice-fritters in our pockets, the outlook was not cheerful.

It was now noon. Calculations showed that we had made about four miles. We must reach the Yosemite by night. The descent again grew steeper and steeper, and the walls of the cañon gradually narrowed, so that we were compelled to walk in the middle of the stream. The most exciting

and dangerous incident of our descent now followed. The walls were not more than a hundred feet apart, and rose a thousand feet or more above us. The stream suddenly plunged into an extremely narrow gorge. We seemed to have reached the final jumping-off place. It was as impossible to climb out of the cañon as to go back, and to go straight ahead seemed out of the question. After a survey of the surrounding wall, we found only one solution to our difficulty. That was to make our way along a very narrow ledge on the right. This ledge, about two feet in its broadest places, sloped downwards toward its outer edge, constantly giving us the sensation, while moving along it, of slipping into the gorge below. Corbett thought that with the aid of the rope he might reach a ledge below, and while I secured and held the end, he lowered himself some distance down the side of the gorge. He was completely hidden from sight, and kept me in constant dread lest he should slip and be dashed against the granite rocks below. All at once the top of his head, followed by an extremely pale face, reappeared above the ledge. He had gotten down fairly well, but had found no good footing below, and had just been able to return by means of the rope. So to descend at this point was impossible, and it seemed as though nothing were left but to crawl farther along the ledge we were on—a very disagreeable alternative, as the ledge grew narrower at every step. We made a few yards on our hands and knees, and then came to a nearly perpendicular slope along which for a distance of thirty or forty feet ran a small ledge. It was about half the width of a man's shoe. Corbett started across, leaning against the wall and placing one foot directly before the other. Slowly, step by step, making each move with the greatest deliberation, he crossed, and finally with a shout of joy reached a level spot beyond. It was now my turn, and, trying to forget the danger, I advanced, keeping my

eyes always before me, directed on the spot where my companion stood. In a few moments—a period which seemed a hundred times longer—I joined him, with a feeling of relief and pleasure that is hard to describe.

For a half-hour or more our descent continued to be a hard one. We let each other down and pulled each other up over ledges and difficult places, the rope seemingly indispensable. At last, about three o'clock, we reached the bed of the stream once more. We then sat down to a lunch and well-earned rest. We knew we were nearing Mirror Lake, because the Half Dome, a guiding-point throughout the day, seemed now not very far distant. The most dangerous portion of the trip was over; the remainder was merely vexatious and tedious. It was a continuous climbing over boulder after boulder. The brush and trees became so thick on the sloping sides of the cañon as to drive us again and again into the stream, compelling us to wade.

It was now about 6 P. M., and we were faint and tired. There seemed no end to the boulders, brush, and undergrowth, and our arms and legs ached from the repeated strains. We were on the left-hand side of the stream and were walking along a grateful level stretch when it abruptly ended in a fall of sixty or seventy feet. We did not want to turn back and search for a means of getting around the fall, and so we looked for a place near by. Standing on a projecting boulder some yards to the right, we saw close at hand a branch of a huge pine whose base was not far from the foot of the fall. Corbett again took the lead, and after some hesitancy swung himself upon the branch, which bent almost double under his weight. He clung to it, dangling in mid air fifty feet above the ground. Hand over hand he reached the main trunk, then slid quickly to the ground. I followed him, and in a few moments our last difficulty had been overcome.

It was growing late, and we knew the boys in the valley would be anxious about our safety. We now came into a dense forest in which we had to struggle through ferns and underbrush and where we were constantly stumbling over dead trunks of trees and creeping vines. It was not until it was evening and completely dark that we finally emerged and found ourselves before Mirror Lake. A few moments more and we joined the other two, who welcomed us as if we were the dead come to life. For once they were glad to see us, and to say that they were thankful,—and we also, for that matter,—would be putting it mildly.

We learned from Mr. Clark, the Guardian of the valley, that Mr. Muir, and one other party, consisting of two men, had made the descent of the cañon. Our trip was the first for over twelve years.

If one loves excitement and peril, he may rest assured that he can find it in the trip we took. As an example of dangerous mountain-climbing, it will serve as one of the best; but neither Corbett nor I would wish any friend the doubtful pleasure of some of our experiences.

AN ASCENT OF CATHEDRAL PEAK.

BY THEODORE S. SOLOMONS.

Somebody once told me that the late George B. Bayley* had spoken of having climbed Cathedral Peak. To those of us who know of the many long rambles in the Sierra by which Mr. Bayley was enabled to regain his health, such an assertion would at least have weight. At the time, however, I was inclined to think that my informant was mistaken in supposing Mr. Bayley to have claimed a complete ascent; for it certainly does not seem possible to reach the highest point of this pinnacle-crested mountain from such views of it as one obtains from the trails.

One day late in August, 1897, a party of the Geological Survey was camped near the base of Mt. Dana. The winter before, Mr. H. W. Turner of the Survey had suggested a trip through the High Sierra east of Yosemite under my guidance, and this was the fulfillment of our arrangements. As guests, were Professor Van Hise, of the University of Wisconsin, Professor Hoskins, of Stanford University, and Mr. Charles A. Bailey. The summit of Mt. Dana was in order for that day, but Mr. Bailey and myself had climbed it and felt *blasé*; so I proposed for us some camera-work in the Tuolumne Meadows and—jokingly—the highest spire of Cathedral Peak; whereat Professor Van Hise expressed the opinion that this mountain was quite inaccessible by all ordinary means. We had ridden half-way around it during the preceding day, and any one who has seen this most

* It is food for reflection that Mr. Bailey should for years have survived the perils of Alpine life only to meet death by an elevator accident in a large city.



CATHEDRAL PEAK (11,500 FT.) FROM CATHEDRAL LAKE, NORTH-EAST
OF YOSEMITE VALLEY.

Photograph by Theodore S. Solomons.



SPIRE OF CATHEDRAL PEAK.

Photograph by Theodore S. Solomons.

striking monument from any point will agree that the noted geologist, even if he were not a trained observer, must have eyed the mountain keenly.

I winked at Bailey and offered to fasten a dishcloth flag to the very summit before evening. Van Hise offered, if this were done, the best supper the hotel afforded for the party on the night of our return to Yosemite; but I was careful to offer no counter forfeit in case of failure—for of course I had no very definite notion that we should succeed.

After taking a few photographs about the meadows, Bailey and I rode our mules up the forest slope toward Cathedral Peak. I think it was about noon when we tethered them in a patch of grass, and with a stout rope and a bit of lunch started for the base of the peak, which was now but a quarter of a mile away.

Our approach to the mountain was from the northeast. The ridge of what would be the roof of the Cathedral runs northwest and southeast; so we were proceeding directly at right-angles to it, and were therefore ascending the slope of the roof. In this there is no difficulty whatever,—save perhaps a psychological one,—if the climber is ambitious of reaching the very tip of the top; for that tip and the tall, slender pinnacles that underlie it and sweep down at a single mighty stroke are directly on one's right, and very near at hand as he ascends the roof. It chills the blood.

Bailey, taking me much too seriously, let his blood speak. I laughed at his fears, and assured him we need not attempt the very top unless it should look easy from some point at present hidden. We reached the ridge in about half an hour.

The opposite slope of the roof for some distance is gentler than the one we had climbed, but a little farther down it dips rather abruptly, and presents bare granite that looked too awkward to be attempted when I photographed the mountain two or three years before. But for

this circumstance the southwestern face would be the best side to climb, for the trail passes immediately below.

We now proceeded on the southern side of the ridge toward the summit. After walking a few rods, we came to a bare slope fortunately riven by cracks in which small shrubs grew. The area of this slope is about a hundred feet in horizontal length by perhaps forty feet in sloping breadth, as nearly as I can recollect, and the summit lay directly east of us. The cracks referred to make the passage of the slope easy enough to justify any climber in undertaking it, and once traversed he finds himself in the position from which was drawn the upper of the two accompanying sketches.

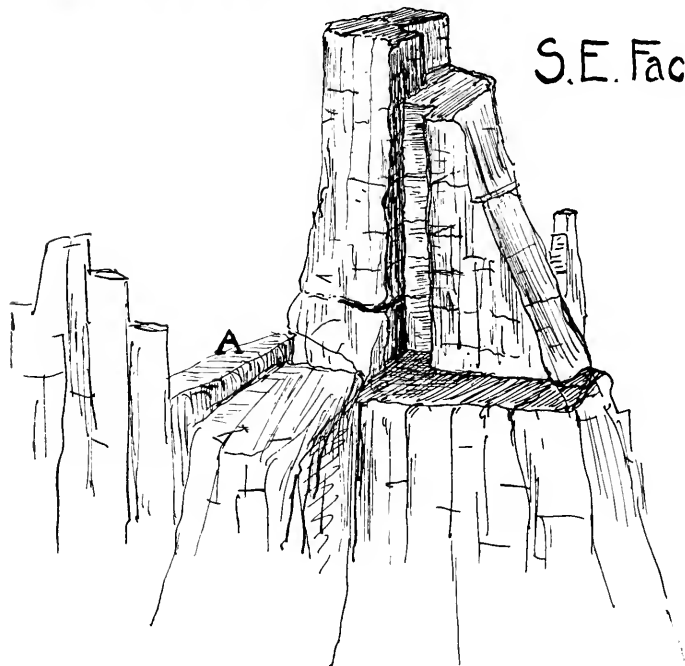
He stands at the base of the summit spire and may cool his cheek against its cool granitic surface; but the shaft is some fifteen feet sheer, and though he has gained most of the practical benefits of the summit of Cathedral Peak the moral satisfactions of the ascensionist are still denied him. It was so with Bailey and me. I "peeked" around the corner. The letter A shows a natural passageway to the southeastern side of the pinnacle. It is also a window for the view in that direction. I could see the little ledge which is shown in the lower sketch, and I could also see the bit of rounding slope that lay between. This, by the way, is more abrupt than it appears to be by the sketch. I could not see the "chimney" which rises from the ledge to the summit; but it is a rule of mountain-climbing never to take it for granted that such aids do not exist. The slope, then, engrossed us. This southeastern face of Cathedral Peak, it will be observed from the photographs, if not from the sketch, is a sheer wall for several hundred feet. Whatever its exact height, it is, at all events, as dangerous as El Capitan.

This brings me to the moral of this little narrative, which, like all morals, is very general in its application. It

S.W. Face of Spire



S.E. Face of Spire



SPIRE OF CATHEDRAL PEAK.



was not the slope in itself, nor, later, was it the chimney in itself, that "gave us pause," for had they risen from level ground we should have attacked them without a moment's hesitation. It was their abrupt termination in nether air that won from us a most cordial respect. The slope, however, we passed without much palaver, and stood on the ledge. At once we discovered the chimney, but I cannot say that we were exactly pleased. I think either of us would rather have found as unbroken a facet of pinnacle on this as on the other side, when we would have heaved a virtuous sigh and returned with the information that only a cowboy with a lariat and a good pair of biceps need apply.

But the chimney seemed put there to make Cathedral Peak accessible—and dangerous. Which preponderated? Bailey, an older climber than I, and, it occurs to me now, rather a wiser one, was for giving it up. Not that he judged the chimney a difficult climb, but he believed we had no moral right to take the chances its ascent involved. I agreed with Bailey in the sentiment, but was disposed to consider the question as to how much "chance" there really was. The chimney was of a nice width and depth for the employment of the knees as a means both of resting and of ascending, and there were several joint-crevasses by which the fingers could assist. The height was not great,—a matter of ten or fifteen feet,—and, on the whole, I decided that any ten-year-old boy who could not wriggle himself up that granite column ought to be spanked. The question of a possible fall, I argued with Bailey, need not be considered, if we were to be consistent with ourselves and with the principles of alpinism, for the reason that whenever a man works upon steep slopes, not to speak of precipitous walls, there is liability of injury or death; yet this does not worry him in the least, so long as there appears to be no likelihood of a fall. Somewhat analogously, railroad-trains may collide; a chisel may fall when one is

passing under a building in process of erection. Vertigo may seize a man upon a balcony with a low railing. These are remote possibilities.

My nerves were good, for I had had two months of continuous mountain-work. The chimney was obviously easy, and I decided to go, though Bailey protested. More to satisfy him than with any belief in its utility, I tied one end of our rope under my shoulders, and leaving play enough — and no more — to enable me to gain the summit of the chimney, fastened the remainder of the rope in the deep crack near the right base of the spire. It was useless, I thought, because this fastening was very insecure; and even if it was not, the rope would probably snap if I were to fall from the ledge.

I ascended the chimney without the slightest difficulty. I then tied the rope securely, and Bailey came up very handsomely, hand over hand, with a little assistance from his knees, which he pressed against the side-walls of the chimney.

Lunch, wrapped in a (clean) dishcloth, and a staff had preceded my companion to the summit; and after discussing the former we made a flag of the two latter, and inserted the pole in a crevasse of the summit, the area of which is sufficient to accommodate three or four men with moderate comfort. It is simply the flat end of an almost perfect prism of granite, slender, and having a slight backward cant, which somewhat modifies the perpendicularity of the chimney. We had also brought one of the club's brass cylinders, for which we built a small monument, Bailey, for this purpose, descending to the southwestern side of the pinnacle and passing up rocks to me by means of the rope. We found no trace of previous ascent. In the issue of the *BULLETIN* for January, 1898, this peak is named among those ascended the previous summer. I wonder whether there are now other names on the scroll.



CASTELLATED DIVIDE BETWEEN THE TUOLUMNE AND MERCED RIVERS.

(Looking North from the base of Mt. Clark.)

In the descent I looped the rope over a projection,—and one needs to be very careful in doing this when he is about to trust thus to the rope,—let myself down, and then whipped the loop free. On our return to the meadows we found some very perfectly spherical pot-hole stones and several large and beautiful rock crystals in a long, deep, and narrow lane, or corridor, of coarse granite. Such lanes are numerous on the northeastern side of Cathedral Peak.

From our camp the dishcloth was not visible even with the aid of the field-glass; but on the strength of Mr. Bailey's reputation for veracity Professor Van Hise made us all his guests at a very elaborate spread on our return to the Valley.

I do not care to assume the responsibility of advising others to attempt the summit of Cathedral Peak. As I have explained, there is no difficulty whatever in reaching it, but a fall from the chimney would inevitably prove fatal; and while I have often taken "chances" of this nature in my out-of-door work, I will never do so again, because I believe such acts to be acts of pure folly. Nine hundred and ninety-nine one-thousandths of the total pleasure and profit of mountain-climbing and mountain life in general may be realized without the slightest danger to life or health, and for the sake of the other thousandth part (a slightly bettered view, perhaps,) it is surely an act of immorality to risk one's life.

The question whether in any given case there is "risk of life" is necessarily an open one. Perhaps any good climber of steady nerves would be justified in the decision that the ledge and pinnacle of Cathedral Peak do not present difficulties sufficient to constitute such risk.

A GLIMPSE OF THE WINTER SIERRA.

BY BOLTON COIT BROWN.

Believing that it is better to be out of doors than in the house, I decided to spend my Christmas vacation in the mountains.

My plan was to leave Millwood with a kind of mitigated arctic outfit, and to push back as far towards the great peaks as should prove practicable. My equipment consisted of two weeks' rations, two extra suits of underclothing, two pairs of blankets, a sleeping-bag of heavy canvas, an ax, a pistol, a pair of snow-shoes (*skies*) and a pole, a 5×7 camera with two dozen plates, a pocket camera with films, and a sled, this latter being simply a metal toboggan eight feet long by two feet wide—in fact, a single ten-pound sheet of rolled iron. My reason for adopting this remarkable article was that I wished to have matters so arranged that I could, at a pinch, travel over even the softest snow.

Arrived in due time at Millwood, there was only bare ground. Mr. Kenawyer, however, readily undertook to pack my stuff the three or four miles to the arctic zone. Soon after entering the gate of the General Grant Park we came to the snow, but it proved so hard that the horses readily walked upon its surface and passed the snowed-up eastern gate by walking over the fence on the crust. Of course, with snow at that depth "the trail" does not exist. The mountain-side along which in summer it runs now presents a steep snow-slope across which man or



MIDWINTER CAMP.



horse must go gingerly, clinging with incisive edge of sole or hoof. Reaching presently an unusually steep descent, the animals pulled back amazed, snorting their disapproval. And as they positively refused to be dragged or bullied over the brow of the pitch, we were forced to change our route from east to south. For the next half-hour, as we wound and plunged along this crest, my attention was divided between avoiding hummocks and hollows and gazing far-off at the deepening sunset colors. For spread over the snow-fields of that tumult of Alps which filled the entire eastern horizon, glowed saffron and rose and wine-color and purple, beyond all imagination of tenderness, flushing over the vast snowy panorama and deepening down the mighty cavernous cañons to depths and intensities that thrilled like richest organ-music. And then it was night.

We tied up the horses to spruce-trees, fed them barley, and ourselves, in a rude camp there on the snow, lay in not unreasonable discomfort until daylight.

Morning came, and we again pressed on southeasterly, descending gradually into one of the gorges tributary to the Bearskin Meadow basin. At the bottom of this the horses broke through so often and floundered so badly that we gave up further packing, and lashing our load upon the toboggan, started to drag it by hand up the eastern side of the gorge. And drag it up we did — although at vast expense of labor. In two hours we had hardly gone more than half a mile, nor ascended more than five hundred feet. At this point, owing to the necessity of his reaching Millwood before night, Kenawyer was obliged to leave me.

The sled with its load may have weighed 130 pounds. A very few minutes' experience with it showed me two things: first, that the sled itself would never stand any considerable journey, but would work itself full of holes, and ultimately to pieces, from the kinking of the iron; and,

second, that over other than a comparatively even surface it would be folly for one man to attempt to haul it. So I tied it to a tree — it was so slippery that otherwise it would have scooted clear into King's 'River — and gave the afternoon to exploring among the ridges and snow-burdened rocks.

I found that I was just on the northern side of the crest of the divide between King's River and the Kaweah, about five miles south of Bearskin Meadow, three miles due east — as afterward determined by the North Star — of Finger Rock, and at an altitude of about 8,000 feet. The snow lay indefinitely deep, covering up into gentle mounds and long breastworks the bushes and logs, and giving to the forest something of a park-like character. The southern side of the ridge, however, was far less polar. Manzanita and all the familiar bushes enjoyed there the bright sun, and all about spread warm dry islands of odorous pine-needles whereon a man might lie and bask until he imagined it summertime. Woodpeckers rattled at the dead trees, and a few other birds swept from tree to tree. Nimble squirrels now and then dashed out of sight and the ever-present chipmunk scabbled violently away in his usual panic. And across the snowy places trailed rows of holes made by the feet of bear, deer, and coyote.

Remaining for that night in the camp where I was, I next morning divided my luggage into four loads, which, at cost of half a day's hard work, I packed up to a cheerful spot on the crest of the ridge. Hardly, however, had I rolled the last burden from my shoulders when the sky began to cloud over and to threaten—so I thought—for the coming night a snow-fall. Now, in my wanderings I had, some half-mile away, come upon a ruined hut of shakes buried in the snow, and toward this, with feelings of keen sympathy for the laborious pack-mule, I now again began to pack my assortment of loads. The roof of the hut was crushed in and buried under several feet of



GLIMPSE OF FINGER ROCK.



snow, but there still remained along the wall an iced cavity, into which I gratefully crept.

Next morning I went back and dragged up the abandoned sledge. Chopping it with the ax neatly into two unequal pieces, of the smaller I made an excellent stove, and of the larger an excellent chimney. I melted up the glittering stalactites of my cave and made tea with them, which tasted, however, less like tea than like superior pine shakes. Cooking-water was better got by quarrying pure, crystalline chunks of hard snow from the heart of a snow-hummock.

On the whole, it seemed wisest to give over the idea of farther travel. My sled was a failure. My load was far too heavy. My rubbers had endured less than one day, while the shoes they had covered acquired great holes before the end of the next. I possessed, indeed, another and slightly heavier pair of shoes, but it seemed to me evident that the constant cutting of the harsh crust-edge would rapidly saw these also to pieces.

And so for several days, with this little camp as headquarters, I roamed about. I played, for the first time in my life, the rôle of photographer, lugging camera, plates, and tripod up hill and down dale with all the enthusiasm of the novice. I used my sleeping-bag as a dark-room for changing plates. And the amazing part is that, having now developed the plates, I find that, by mere luck and guess-work, the times of the exposures were right, and that I have a picture for every one of the twenty-four plates exposed.

One day I crossed the basin eastward, and climbed to the top of Finger Rock. The camera I hauled up from stage to stage by a rope. The summit of this crag commands a quite unobstructed view of the High Sierra, from the awful spikes away beyond the Middle Fork in the north round to Goat Mountain, King, Gardiner, Brewer, Milestone, Table Mountain, and the superb mass of the Kaweah, and

all shone in the winter sunshine, dazzling, resplendent, and indescribably beautiful in their vast white blankets. I exposed four plates—three as a panorama—and all were surprisingly successful. As giving an idea of the practical rate of travel, I may say that this expedition, though its length, all told, could not have exceeded six miles, occupied one entire laborious day.

All the weather was perfect. During the middle of the day the thermometer, in the shade, probably remained somewhat below the freezing-point. At night it may have descended twenty or more degrees. The clouds proved false prophets, for not a snowflake fell. Still and sunny were the days,—so still you could hear your ears ring,—and still and starry were the nights. From the mysterious vastness of the fir forest the great owl hooted to the sailing moon, and at dawn the shrill cry of the coyote came ringing over the frozen snow. A woodpecker at the corner of my cabin rapped me up for breakfast.

As looking towards some similar trip in future, by myself or by others, a few words of criticism may not be amiss. First, then, concerning the sled: The sled should be a pair of very low, light, and not too short "bobs." They should be so low and so smooth upon the under side that in very soft snow they slide on the under surface of the top board. The runners should be about three inches wide, and, to enable them to creep along hill-sides without constantly slewing sideways down the slope, they should have a section like this:



I think that for warmth at night one should depend partly upon fire. A sheepskin sleeping-bag, wool inside, and one pair of blankets would be satisfactory. It is necessary to be able to resist a night temperature of about zero. When I returned to Millwood the thermometer showed only six degrees above this, and I had been camped nearly 4,000



FROM FINGER ROCK—LOOKING TOWARD THE KAWEAHS.



feet above Millwood. A man equipped with, say twenty pounds of extra clothing, twenty pounds of condensed foods, and ten pounds of sundries,—fifty pounds in all,—could travel,—well, almost anywhere.

For the most part the snow is pretty hummocky. Every bush, rock, and log forms a hillock; and bushes, rocks, and logs cover practically the entire surface of that part of the earth. Now and then the pedestrian crashes through waist-deep, more or less, and if this occurs when he is rapidly going downhill, he may be thrown forward with some violence. As I happened upon the snow, however, this rarely took place. There were two crusts, from one to twelve inches apart; the foot always went through the first, and was almost always stopped by the second.

Horses or burros also take an occasional crash through, much more to their alarm than to their harm. Mostly, however, they go along well enough. There is need of judgment in selecting their route. They should be kept on the northerly slopes and off those hummocks that cover bushes, such being hollow and easily crushed in. In general, very deep snow is every way more satisfactory than shallow, because it is good everywhere, and one may disregard what is beneath it.

Our experience showed that in some not unusual conditions of the snow horse-packing is quite feasible. When I was returning to Millwood we had a horse and two burros. I was supposed to ride the horse, and was actually in the saddle perhaps half the time. With these three animals we traveled on a winter's day quite easily, over the snow, a distance of perhaps eighteen miles. Animals can go down slopes that they cannot go up. We slid our little train down some remarkable descents. Sometimes they kept their feet and slid, and again they collapsed and slid; but in either case, as there was nothing but snow, it was

almost impossible for them to hurt themselves. At one place the two burros slid two hundred feet at a swoop.

With snow hard and settled weather, it would seem possible to take barley for the horses, and to travel straight east from Millwood for two days, landing somewhere near the western foot of Mt. Brewer. In such an attempt no attention whatever should be paid to usual routes of travel, but the divide between King's and Kaweah River should be followed from the General Grant Park until the Roaring River basin is entered, across which, right on east, the traveler would work his way.

January, 1901.

SIERRA CLUB BULLETIN.

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The purposes of the Club are:—"To explore, enjoy, and render accessible the mountain regions of the Pacific Coast; to publish authentic information concerning them; to enlist the support and co-operation of the people and the Government in preserving the forests and other natural features of the Sierra Nevada Mountains."

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NOTES AND CORRESPONDENCE.

In addition to longer articles suitable for the body of the magazine, the editor would be glad to receive brief memoranda of all noteworthy trips or explorations, together with brief comment and suggestion on any topics of general interest to the Club. Descriptive or narrative articles, or notes concerning the animals, birds, forests, trails, geology, botany, etc., of the mountains, will be acceptable.

The office of the Sierra Club is at Room 45, Merchants' Exchange Building, San Francisco, where all the maps, photographs, and other records of the Club are kept.

There are but a few copies on file of No. 3, Vol. I., of the BULLETIN. The Club would like to purchase additional copies of that number, and we hope any member having extra copies will send them to the Secretary.

The present number of the BULLETIN has been delayed by errors in making some of the illustrations. J. S. H., JR.

A CORRECTION.

In a small map of the region near Tower Peak, in Vol. II, opposite page 279 (Plate XXXV) of the BULLETIN, the scale of miles is given as two miles to the inch. It should be four miles to the inch.

PROPOSED SUMMER OUTING OF THE SIERRA CLUB—REPORT OF COMMITTEE.

Realizing that the Sierra Club has heretofore neglected one of the most effective means for promoting its objects, a committee has been appointed by the Directors to investigate and report on the feasibility of having a general club outing during this coming summer. An excursion of this sort, if properly conducted will do an infinite amount of good toward awakening the proper kind of interest in the forests and other natural features of our mountains, and will also tend to create a spirit of good-fellowship among our members. The Mazamas and Appalachian Clubs have for many years shown how successful and interesting such trips may be made.

The committee have canvassed the situation thoroughly, and after considering possible routes have decided that our initial trip should be made to the Tuolumne Meadows. It is essential that this first trip—inaugurating, as we hope, a series of annual out-

ings—should be as complete a success as possible. We have chosen the Tuolumne Meadows as our objective point for many reasons. The first trip should combine comparative ease and comfort with the opportunity of seeing some of the grandest scenery of the Sierra, not too commonly visited as to lack distinction. The Tuolumne Meadows is the most attractive region in the High Sierra proper which can be reached by road, thus admitting of travel thither by stage. It is particularly fitting that our first trip should be into the very heart of our grandest and most widely known mountain scenery. The old Tioga mining road, over which we will travel, passes between the Yosemite and Hetch-Hetchy Valleys, and within a few miles of each. Our present plan is to give the entire party an opportunity of seeing the Hetch-Hetchy, and arrangements will be made so that all those who wish to visit Yosemite may do so at a small additional expense.

The Meadows are described as follows, in the words of those whose names will lend added weight to what they say:—

Prof. Joseph Le Conte, in his "*Ramblings Through the High Sierra*," says: "The Tuolumne Meadow is a beautiful grassy plain of great extent, thickly enameled with flowers, and surrounded with the most magnificent scenery. Conspicuous amongst the hundreds of peaks visible are Mt. Dana, with its grand symmetrical outline, and purplish red color; Mt. Gibbs, of gray granite; Mt. Lyell and its group of peaks, upon which great masses of snow still lie; and the wonderfully picturesque group of sharp, inaccessible peaks (viz: Unicorn Peak, Cathedral Peaks, etc.), forming the Cathedral group. Soda Springs is situated on the northern margin of the meadow. It consists of several springs of ice-cold water, . . . pungent, and delightful to the taste. . . . To any one wishing really to enjoy camp-life among the High Sierra, I know no place more delightful than Soda Springs. Being about nine thousand feet above the sea, the air is deliciously cool and bracing. The water, whether of the spring or of the river, is almost ice-cold, and the former a gentle tonic. The scenery is nowhere more glorious."

Referring to this same region, the U. S. Engineers report as follows: "Peaks capped with perpetual snow are numerous. Mts. Hoffman, Conness, Gibbs, and many others raise their heads to an elevation in excess of 12,000 feet, while Mts. Dana, Lyell, and McClure (over 13,000 ft.) have in addition living glaciers of great beauty, equal in interest to those of Switzerland. . . . Following along the Tioga road a series of lakes and streams are passed that are unequaled for fishing. The scenery is particularly grand, and there are found here a number of mineral springs

which are equal to any of the famed springs of the country. . . . Through this section of the park wood, water, and grass abound, making it a paradise for campers."

In reply to an inquiry relative to this proposed trip, our honored President, Dr. John Muir, writes: "I think the trip to the Big Tuolumne Meadows the best possible."

Our route over the Big Oak Flat and Tioga roads takes us through some of the grandest and most varied forest belts in the State, and the flora, ranging as it does from the foothill varieties to those of the highest Alpine growth, is instructive and wonderful beyond description. On the Tioga road particularly, we cross numbers of beautiful meadows and streams; and after rounding the base of Mt. Hoffman, to use again the words of Prof. Le Conte, "Lake Tenaya bursts upon our delighted vision, its placid surface set like a gem amongst magnificent mountains." From our permanent camp in the Tuolumne Meadows the interesting Mono country, with its lake and volcanic craters and chemical springs, can be easily reached in a day. The grand cascades and rugged scenery of the head of the Grand Cañon of the Tuolumne can be visited and return to camp made the same day. Nowhere is there such an opportunity for variety of wonderful and interesting trips, taking not more than a day or so each, which can be made from the same starting-point, as here in the meadows. It is our intention to make the ascent of Mt. Lyell as a party, and for one night at least we will camp at its very foot. The ascent to the summit can be made in a few hours from this point, and takes us over its glacier, one of the largest and finest in all the Sierra. On the summit of Mt. Lyell is a record left by a member of the German Alpine Club to this effect: "The view from this point equals anything I have ever seen in the Alps."

Dr. John Muir has promised to go with us on this trip and in all probability Prof. Joseph Le Conte will accompany us. The committee have corresponded with the departments of Geology, Botany, and Zoology of both Berkeley and Stanford, and we are almost certain to have professors to represent each of these branches of science. We will have camp-fire talks on all the scientific phases of the trip. This educational feature alone will make the trip an extremely desirable one.

Some have raised the objection that traveling with a crowd will be disagreeable. On the contrary, we feel it will add largely to the interest of the trip. Only members of the club and their immediate friends will be eligible to join the party, and this will be a sufficient guarantee as to the high class and tone of the same. We will arrange so that those who are particularly congenial can travel in groups practically by themselves. Experienced mountaineers will also find this trip desirable, since their outfits can be

transported to the Meadows, which they can make a base for trips to Mt. Ritter and the more inaccessible portions of the High Sierra.

The evening camp-fire will be a most attractive feature. Many will have musical instruments, and lectures, story-telling, and songs will make a most delightful ending for each day's pleasure.

The discomforts ordinarily incident to mountain trips will be reduced to a minimum. The irksome duties of cooking, dish-washing, and provisioning will be turned over entirely to a commissary department. All transportation of outfits, etc., will be attended to by the committee, thus relieving the party of all drudgery and leaving their time entirely free for enjoyment of scenery and mountain life. The trip will be particularly attractive for women, and every effort made to secure comfort usually lacking in excursions to the high mountains.

We have already provisionally arranged with the stage company to transport the entire party from Chinese Camp to the Meadows, and it will probably be at the option of the members of the party to make the trip either by stage or horse-back. The entire cost of the trip, including provisioning, hire of cooks, transportation of baggage, railroad and stage fare from San Francisco and return, will be in the neighborhood of forty-five or fifty dollars. The same trip could not be taken individually with the same comfort for less than seventy-five or a hundred dollars. The trip will also be arranged so that those who wish may walk, either from Chinese Camp or Crocker's, thus considerably lessening the above-named rate.

The main trip will be taken sometime during the month of July, and will cover a period of two weeks, though all who wish to stay for a greater length of time will be accommodated.

There seems to be no question but that this trip will be one of the greatest events of the next season. From the applications which have already been made by those who have learned that such a trip may be taken, its success is already assured, and it will be a grave question whether we will be able to accommodate all who will wish to join the party. In that event, those who first apply will be given the preference. A detailed prospectus of the features of this proposed trip and what it will be essential to take, etc., will be issued as the season approaches.

Those who wish to learn further of this wonderful country are referred to the January (1900) BULLETIN of the Sierra Club, containing Prof. Le Conte's "Ramblings Through the High Sierra," pages 50-80, and to John Muir's delightful book, entitled "The Mountains of California."

Very respectfully,

WM. E. COLBY,
Secretary of Sierra Club.

NOTES ON CERTAIN TRAILS IN FRESNO COUNTY.

A party consisting of Messrs. H. M. Hall, E. B. Babcock, and myself spent a portion of the summer of 1900 in the Southern Sierras. We had headquarters at Ockenden and made trips to Tehipite Valley and Mt. Goddard.

The trail to Tehipite Valley is fairly well known, but we made one or two side-trips which may be of interest. The first of these was to the Bald Mountain region, whence a magnificent view of the Mt. Goddard Divide and the lake country at the head of Dinkey Creek may be had. In a meadow a few hundred yards before it crosses Bear Creek, the main trail forks. The left fork leads to the cabin of "French Louis," a most hospitable old miner, and from his pasture a good trail leads along a miner's ditch to Bear Creek, which it follows for perhaps three miles in a northeasterly direction. It is finally lost in a large wet meadow, from which one can work his way (even with mules, as we did) to the top of the ridge, of which Bald Mountain appears to be the highest point. This trip can be made easily in one day, and is well worth while, for no satisfactory view of the higher mountains is obtainable along the main Tehipite trail.

Our other side-trip was a mistake. About a mile beyond House Meadow the trail crosses a little meadow and emerges in two branches. We took the one to the right, as it seemed the more traveled, and brought up an hour later in a very large meadow, where the trail was lost. We beat around here for a day or more before we discovered that we should have taken the left-hand trail, two miles back.

At Collins Meadow the beginning of the Tehipite trail is marked by a T blazed on a tamarack pine. It is good, except the first quarter-mile. We passed over the trail on July 5th, and were the first party of the season — perhaps the only one.

The trail from Ockenden to Blaney Meadow, on the South Fork of the San Joaquin, is excellent. It is best to go from Ockenden to the east end of Shaver Lake, where the trail starts which follows the North Branch of Stevenson Creek and joins the other some miles above. We were not aware of this, and went to the west end of the lake, through the settlement of Shaver and Sulphur Spring Meadow. Here we found great difficulty in choosing from the myriad of cattle and sheep trails, and no quantity of written instructions would avail to guide another party. Once on the main trail, it is easily followed. It should be noted, however, that the Mono Trail, which branches from this one just west of Tamarack Creek, is better blazed and apparently as much traveled: keep to the right. We passed between Red Mountain and a beautiful lake, the source of Pittman Creek and soon after

entered the Short Hair Meadows, a plateau several miles in extent, covered with a short growth of carex which is poor feed. Black Mountain, which arises almost out of the plateau, is the best-known landmark of the region. A shorter route to Ockenden is said to run from here, past Dinkey Lake and on the west side of Dinkey Creek, to Markwood Meadow, which is on the road traversed in going to Tehipite Valley. Two parties who had been over the trail earlier in the season reported it rough but entirely passable.

The descent into the cañon of the San Joaquin is easy and Blaney Meadow is camping-ground *par excellence*. From here the foot of Mt. Goddard is easily reached in one day, though the trail is bad. Feed is plentiful along the route and there is good camping-ground at the very base of the mountain.

The ascent of the peak is not difficult if the snow-lick on the west side is followed. We found the Sierra Club register in the monument on the summit and inscribed our names with those of fifteen others who have made the ascent since September 23, 1879, when, as a small yellow document proclaims, the mountain was first climbed by Lil. A. Winchell and Louis W. Davis.

Berkeley.

HARLEY P. CHANDLER.

RECENT WORK ON TRAILS IN THE MOUNTAINS OF TULARE AND FRESNO COUNTIES.

So great is the increase of annual travel by tourists and campers into the Sierra Nevada in and about the Mt. Whitney region that recent improvements in old trails, and the laying out of new ones, is here noted for the benefit of those who penetrate into those altitudes.

The rangers employed by the Government in the forest reservations are doing much valuable work during the summers in improving and shortening trails, and mountain parties who become familiar with their work will appreciate it.

During the summer of 1899, Forest Ranger Ernest Britten viewed out and marked a new trail from Mineral King to the Giant Forest, which materially shortened the time between these two popular points. This trail on leaving Mineral King passes through Timber Gap, thence by way of Redwood Meadow and Bear-Paw Meadow to a point on Buck Cañon high up near its source, near Alta Meadows. The old trail is intersected at Panorama Point. This trail, by hugging high altitudes near the upper margin of timber a considerable part of the distance, avoids the dreaded "Seven-Mile Hill" and other steep climbs.

Ranger Britten, later the same season, also greatly improved the trail following along the west side of the Kern Lakes, and the same trail below the lakes.

In the same vicinity the trail which formerly led from near the bed of Kern River over a granite palisade to the lakes, was last year changed by Ranger Harry Wilkinson, so as to wholly avoid the dangerous way up the bed of a small creek worming its way amidst great boulders in a narrow gorge. This was a hazardous trail over which few persons dared to ride, and was extremely difficult for the best animals.

The old trail from Kern Lakes to Mineral King via Trout Meadow was much shortened by the Coyote Pass "cut-off," but only the most experienced mountaineers cared to make a second attempt to cross by this pass. Going *toward* the lakes it was impassable for horses or mules. Last summer Ranger Britten viewed out an excellent trail which can be traveled either way, and which cuts down the time between these points one-half. By the new route a light pack-train can make the distance from Mineral King to the lakes in a day, and with heavily loaded animals it can be done with comfort in a day and a half. Leaving Mineral King one goes over Farewell Gap by the old trail, and before reaching Broder's Meadow bears off toward Prison Meadow. Shotgun Cañon is crossed above Coyote Pass, and the trail holds the high grade on the granite saddle between Shotgun and Rifle Creeks and leads through the first gap north of Coyote Pass, and joins the old trail near the lower, or eastern, end of Coyote Meadow.

Between Mineral King and Tar Gap, south of Atwell's Mill, a good way has been opened, and during the past summer four miles of trail were completed by Ranger Britten and soldiers under command of Captain Frank West, Acting Superintendent of Sequoia and General Grant National Parks.

Captain West has also instructed Ranger Britten to view out another trail from Mineral King to Giant Forest, to pass below Alta Meadows and follow as nearly as possible the route of a future wagon-road, one of the desirable improvements hoped for.

From the Old Colony Mill, Captain West has had a good trail made to Admiration Point, a mile distant, where a grand view of the falls of the Marble Fork of the Kaweah is to be had.

From Giant Forest a good trail may be traveled to Halstead Meadow. Ranger Samuel Ellis late last season completed the blazing and marking of a good trail from Halstead Meadow north to Horse Corral Meadow, from which King's River Cañon may be reached readily. This is now the easiest and most interesting trail into that majestic cañon.

Those who have journeyed down into King's River Cañon from the south side will remember the long slick rock encountered after fording Boulder Creek. Seldom has a pack-train passed over this smooth stretch of granite without one or more animals falling and sustaining injuries more or less severe. Last summer A. D. Ferguson, when passing this way with a large force of miners, en route to copper mines farther inland, tarried there long enough to construct a good trail around this dangerous point. And now that this stretch of slippery granite may be avoided, the descent into the Grand Cañon of King's River may be made with perfect safety to travelers and animals.

GEO. W. STEWART.

BOOK NOTICES.

WHYMPER'S "SCRAMBLES IN THE ALPS" needs no introduction to Sierra Club members. If there is any one book that holds the rank of *facile princeps* among books on mountaineering, surely it is this book. If any reader has not read it, let him do so now, when the appearance of this handsome fifth edition, on good paper, in clear type, and excellently illustrated, makes it generally accessible. Surely no one who loves the mountains or who is interested in mountaineering can close its once-opened covers until the last word is read. Besides its value as a guide to Alpine travel it is so thrilling a narrative of indomitable courage and unquenchable enthusiasm that it will long hold its place as a classic among books on mountain exploration. The club-library is indebted to the author for this copy. (Publisher, John Murray.) "The Pleistocene Geology of the South Central Sierra Nevada; With Especial Reference to the Origin of Yosemite Valley," is to the non-scientific reader a rather formidable title to a monograph by H. W. Turner, of the U. S. Geological Survey; issued by the California Academy of Sciences. The somewhat technical title should not deter any person interested in Yosemite Valley and the problem of its origin from a careful perusal of the interesting paper by Mr. Turner; for, even by those untrained to geology, the discussion of the origin of the valley will be found entirely comprehensible and extremely interesting. It enters into a critical review of all the prominent theories that have been advanced, and classifies them under four heads: *First*, the theory that the valley has been scooped out by glaciers (Muir); *second*, that it was formed by river erosion, but that the V-shaped cañon thus produced had been cut back at the bottom and the walls made vertical by the "sapping" action of ice—that is, by the more rapid disintegration resulting from the constant freezing and thawing of water at the edge of the glacier which flowed through the valley (Johnson); *third*, that it was formed by a drop-fault or subsidence of the valley floor (Whitney, Le Conte, *et als.*); *fourth*, that it was the result of river erosion, like other Sierra valleys, the vertical walls being the result of vertical jointings in the rock. This

theory advanced by Becker and Branner is supported by Mr. Turner also. This copy of Mr. Turner's paper is presented to the club for the club-room in Yosemite Valley, and should prove of great service there.

The Himalaya Mountains present some peculiar phases and difficulties in mountain travel, if we may judge from that handsomely printed and illustrated book, *In the Ice World of Himalaya*, published by two persistent travelers, Fanny B. and William H. Workman. Imagine assaulting a mountain climb with parties of forty or more coolies and guides, who by bribes and threats may be spurred to a day's march of five or six miles, and who finally may refuse absolutely to go farther when the traveling becomes bad and the mountains begin to get interesting. Yet such were among the difficulties necessary to be overcome by these travelers in establishing a base of their climbing excursions. Yet, by persistency and lavish expenditure of money, they succeeded with their Alpine guide, Zurbrigga, in making some very interesting climbs, and their descriptions and the excellent reproductions of photographs taken by them bear evidence to the grandeur of those magnificent mountains.

Three lofty summits were ascended, and the altitudes then reached by Mrs. Workman are claimed to establish the record for women-mountaineers. These summits were the Siegfriedhorn (18,600 ft.), Mt. Bullock-Workman (19,450 ft.), and Koser Gunge (21,000 ft.). Mr. Harrington Putnam kindly presented the volume to the club. (Published by Cassell & Co.). *The Rockies of Canada*, by W. D. Wilcox (Putnams), is a book that will be welcomed by the ambitious mountain-climbers. It is a development of his earlier work *Camping in the Canadian Rockies*. The new book, containing careful maps and well illustrated, will be indispensable to travelers who wish to explore this grandest mountain region of the continent.

THE REPORT OF THE COMMISSION ON ROADS IN YOSEMITE NATIONAL PARK, CALIFORNIA: Senate Document No. 155, (Fifty-sixth Congress,) printed February 8, 1900, is made to the Secretary of War by Col. S. M. Mansfield, Engineer Corps, Capt. H. C. Benson, Fourth U. S. Cavalry, and J. L. Maude. The commission's instructions were very comprehensive. They were to collect information on the length, elevations, ownership, rates of toll, length of season open to travel, concerning all the roads in the Yosemite Park; also data, any route of any desirable new road — one to Hetch-Hetchy Valley, and one connecting the old Tioga Road with the Inyo Valley. Such a report must necessarily contain many tables of statistics and estimates. Many of

the elevations ought to be of great interest to tourists or campers, and these are reduced to a profile map in the case of the Tioga Road and its proposed Inyo connections. A large map showing all connections from the west, present and proposed, with the Yosemite Valley accompanies the report.

We have seen only the prospectus of Mr. Abbott Kinney's *Forest and Water*, a volume of three hundred pages and forty-four half-tone illustrations of our forests and mountains. Its topics are all living ones, on subjects particularly belonging to the Pacific and Great Basin regions. Nine chapters are written by as many specialists on questions of irrigation, engineering, tree-planting, and forestry. One of these contributors is Mr. J. B. Lippincott, of the U. S. Geological Survey. Price of volume, \$2.00. Post Publishing Co., Los Angeles.

Concerning the contents of the numerous exchanges, we have not space to speak, except to call general attention to many interesting accounts of travel and exploration that may be found in the numbers of the National Geographic Magazine, and the Bulletins of the American Geographical Society.

PUBLICATIONS AND EXCHANGES RECEIVED.

The Club Library has received the following publications and exchanges:—

A Guide to Chamonix and the Range of Mount Blanc. By Edward Whymper. Edition 1900. London: John Murray. (Compliments of the author.)

A Guide to Zermatt and the Matterhorn. By Edward Whymper. Edition 1900. London: John Murray. (Compliments of the author.)

Practical Tree Planting in Operation. Bulletin No. 27, United States Department of Agriculture, Division of Forestry. By J. W. Toumey, Superintendent of Tree Planting.

Mazama Quarterly. Rainier number. With map. Vol. II, No. 1.

National Geographic Magazine. Vol. XI, Nos. 5-8, 12.

Bulletin of the American Geographical Society. Vol. XXXII, No. 3, 1900.

Bulletin of the Geographical Society of Philadelphia. Vol. II, No. 6, Dec. 1900.

The Scottish Mountaineering Club Journal. Vol. VI, Nos. 32, 33.

Alpine Journal. Vol. XX, No. 148.

Revue Alpine. 6^e année, N^s. 5-12.

L'Écho des Alpes. 1900. N^s. 5-12.

Revista Mensile del Club Alpino Italiano. Vol. XIX, N^s. 8-11.

Bollettino Società Geografica Italiana. Serie IV, Vol. I, N^s. 6-10.

Elenco Generale Dei Soci al. 1^o. Maggio 1900. Supplemento alle pubblicazioni della Società Geografica Italiana. Serie IV, Vol. I, del Bollettino.

"Sicula" Rivista trimestrale di Alpinismo studi geografici, ecc. sulla Sicilia pubblicata dal Club Alpino Siciliano. Anno V, Palermo, 1 Luglio 1900, N^s. 2-3.

Bollettino Trimestrale del Club Alpino Italiano. Luglio, Ottobre, 1900. N^s. 3-4.

In Alto. Anno XI, N. 3-6.

Boletim da Sociedade de Geographia de Lisboa, 17^a Serie 1898-1899, N^s. 3e4.

La Géographic. Bulletin de la Société de Géographic année 1900, N^s. 8-12.

VII Jahresbericht der Geographischen Gesellschaft zu Greifswald. 1898-1900. Den Norske . . . Turistforenings Aarbog for 1900.

Jahrbuch des Siebenbürgischen Karpathenvereins, XX Jahrgang 1900.

FORESTRY NOTES.

 EDITED BY PROFESSOR WILLIAM R. DUDLEY.

NEW FOREST RESERVES. On the 29th of June, 1900, President McKinley added to the great Big Horn Forest Reserve, in Wyoming, timbered areas on both sides of the former boundaries to the amount of 53,120 acres, making its present area 1,180,800 acres. On the 10th of the following October, for the purpose of protecting the source of the chief water-supply of the city of Cheyenne, the President established by proclamation the *Crow Creek Forest Reserve*, Wyoming, comprising 56,320 acres.

PROSPECTIVE NATIONAL PARKS. *The Calaveras Big Trees:* There is every reason to believe that the bill leading to the ultimate acquirement of the above, by the United States, will be carried through the coming session of Congress (indeed, it has already passed the Senate), and that the groves, with the adjacent forest, will be erected into a national park. The following letter from Senator Hoar to Mrs. Emma Shafter Howard, printed in one of the San Francisco papers, November 5, 1900, indicates the very cordial feeling toward this bill among the Eastern Senators and Members of Congress, and is only one of a number received:—

MY DEAR MADAM: I think the State of California ought to have intelligence and public spirit enough to save her wonderful trees. I do not think Massachusetts would ask any help of the United States Government if *she* had them. But I should not myself stand on any ceremony, but should favor prompt action of any power sufficient to accomplish the result. So I shall gladly do what I can to aid Senators Perkins and Bard, if they move in the matter. I am faithfully yours,

GEO. F. HOAR.

The playful thrust at California is but natural on the part of a Massachusetts Senator, even if he knew how very wise the women of California have been in keeping the question of the preservation of the Calaveras Big Trees out of the sinuous paths of State politics. The friends of this movement may feel quite

safe in asserting its propriety as a national one,—the world, indeed, is interested in the preservation of the Big Trees as in no other living species of plant. Single trees of greater diameter exist in Mexico, in Sicily, and perhaps elsewhere, and forests of greater height in Australia, and apparently also among the Coast redwoods of California. But none of these have the combination of majestic and attractive characters,—the height, diameter and beauty shown in the Big Trees. The great ahuehuete (Mexican cypress) of Santa Maria del Tule, near Oaxaca, has a girth of 112 feet four feet above the ground, and 104 feet five feet above the ground. The chestnut (*Castagno di Cento Cavalli*, or "Tree of a Hundred Horses"), in the forest of Carpinetto, on the northern slope of Mt. *Ætna*, has a trunk (the interior, and in places the exterior, is entirely burned away) of about 190 feet in circumference. But the cypress is only 150 feet in height, and the chestnut a low tree. As one looks at them, neither have the symmetry and impressiveness of our Sequoias. *Eucalyptus amygdalina*, the "Wangara" of Australia, occasionally over 500 feet in height (it is given by Engler as 155 meters), and probably the tallest species of tree in the world, the writer has never seen in the forest. When the Australians desire it set apart in a national park, we will heartily second their efforts as a matter of international interest.

The Minnesota National Park: This proposed park lies in the lake country northeast of Duluth and in northern central Minnesota. The Mississippi River enters it twenty miles east of Lake Itasca, and out of its 830,000 acres nearly 220,000 are covered by the waters of its numerous lakes. The nation still owns this tract in the form of three Indian reservations, on which about 120,000 acres of scattered allotments to the Indians have been made. To secure the Indians in their rights on these reservations, it is proposed to credit them with the value of these lands—apparently between \$1,200,000 and \$1,500,000—pay them each year interest on the amount, from the United States Treasury, and yet leave them undisturbed on their allotments.

The proposition is supported by the best citizens of the State, and opposed by few outside the city of Duluth. The House Committee on Indian Affairs reported favorably a bill appointing a commission of six members—three from the Senate, three from the House—to consider the advisability of such a park, but further action was postponed until the present winter. There is much pine and some merchantable hardwood on these lands. According to Gen. C. C. Andrews, the timber in the park will be cut only on well-established forestry principles, the lakes kept stocked with fish, the woods with deer and moose, the lakes, as

reservoirs for the Mississippi, preserved in their normal condition, and the region made a pleasure-ground for the camper.

The Appalachian National Park: To one who has seen something of the forests of the world, this proposed park appeals more strongly than any other, after those preserving the Big Trees of California, and possibly the Coast redwood. In its larger outlines it was to extend from Southwestern Virginia, along the Appalachians through North Carolina and Tennessee, to the borders of South Carolina and Georgia. Containing the highest peaks east of the Mississippi, and next to Japan a greater variety of trees and shrubs than any other similar area, it lies in the very middle of that belt between 30° and 40° north latitude, which contains by far the most varied and interesting forests of the Northern Hemisphere. The hardwood forests of the Southern Appalachians are probably the most stately and beautiful of their kind in the world, as the forests of California are superior to all others in coniferous species; the former region, moreover, shares the distinction with Japan of being the last retreat of some of the oldest and rarest types of flowering shrubs and trees we know. The above-named facts, combined with the intention to make it a pleasure and health resort for the people of the Atlantic States, are much better reasons for creating a *national* park than any mere utilitarian reasons. Unfortunately, most of the desired territory is no longer national, but private, and therefore must be purchased, involving the appropriation of a large sum. The last Congress, however, authorized a committee to report on the boundaries and benefits of the proposed park, and there is a strong feeling both in and out of Congress in its favor. One of the indirect benefits of the energetic work of the California Club in successfully enlisting the interest of Congress in the Calaveras Groves has been to greatly encourage the friends of the Appalachian Park to a similar effort.

A NEW SURVEY. The boundaries of the Sequoia National Park were relocated during the past summer by a party of surveyors under Mr. I. N. Chapman. The original plotting was based on one of the notorious "Benson surveys," and was found very inaccurate. Elevations were constantly taken along the line of survey, and these have been reduced to neat profile diagram, showing that its highest point is reached in the Mt. Vandever region west of Farewell Gap (about 12,000 feet), and its next highest on the rocky plateau east of Mt. Silliman; while it descends to about 1,600 feet, where the line crosses the Middle Fork of the Kaweah above Three Rivers, the lowest point in the park. The work is apparently very well done.

MAJOR WEST'S
REPORT.

The Report of the Acting Superintendent of the Sequoia and General Grant National Parks, to the Secretary of the Interior, for 1900, by Frank

West, Ninth U. S. Cavalry, is the best report on these parks that has appeared. It is admirably illustrated with photographs of the Sequoias and the waterfalls in the Sequoia Park, and of the snowy Sierras eastward. Its terse recommendations are very much to the point. The following will meet with the approval of the Sierra Club:

First — That two forest rangers be employed in the Sequoia Park during the period while the troops are in winter quarters at the Presidio, to protect the game and the timber and look to the condition of the roads and repair trails.

Second — That an accurate topographical survey of the parks be made by the U. S. Geological survey.

Third — That the park boundary lines be extended eastward to Mt. Whitney and the main Sierra divide, and northward to take in the King's River Cañon.

In other places he brings forward important suggestions, which we would urge upon the attention of the Sierra Club. The first in importance is the extinction of the private claims among the Sequoias within the parks, particularly the milling now going on on the Atwells claim and the McFadzean claim. This destruction is conspicuous and painful, as the claims are on the Mineral King road; and it is entirely wrong that in a park intended for the people's pleasure-ground such a thing should be permitted.

Then, again, steps must be taken to condemn the claims about the meadows, including many Sequoias, in the Giant Forest. The United States is now building a road into the Giant Forest by way of the "Colony Road" route, and all private ownership in the forest should be excluded, for obvious reasons, before the road is completed.

The writer has visited this park for the past five years, has explored most of its recesses, and feels an unusual interest in its welfare. Not only does the great Visalia and Hanford district depend wholly upon the Kaweah, and the Kaweah on the forests of this park, for existence, but I have been particularly impressed during the past summer with the fact that the Sequoias themselves occupy the vital forest zone of the Kaweah and Tule River basins. The cutting of the Sequoias about the Atwells, the King's River, and other mills is everywhere accompanied by the destruction of all the pine, fir, and cedar, and the result will be disastrous to the stream flow of the regions denuded. The watchword of the San Joaquin Valley should therefore be: "Protect the Big Trees everywhere."

RESERVES OPEN
TO SHEEP.

On the 14th of November,—fortunately at the beginning of winter,—United States District Judge Wellburn, at Fresno, decided that the Act of June 30, 1898, authorizing the Secretary of the Interior to make regulations for the protection of the forest reserves, is unconstitutional, because, in effect, it delegates legislative power to an administrative officer. This decision practically throws open all the reserves to the pasturage of sheep. A few years ago the breaking-down of such a law would have been alarming; but public sentiment is such at present that it will soon be remedied by Congressional enactment, because it *must* be.

THE ARMSTRONG
REDWOODS.

Col. J. B. Armstrong, a late citizen of Cloverdale, California, expressed a wish, before his death, that his family present a tract of *Sequoia sempervirens*, 400 to 500 acres in extent, situated near Guerneville, to the State as a public park. According to the press accounts, he would have completed the gift in his lifetime, "but for the intricacies of the law." If California had a Board of Commissioners of Public Reservations of the high personal and non-political character of that in Massachusetts, probably she would receive frequent gifts of this kind, as Massachusetts has, but the "intricacies" of politics, rather than the "law," will turn aside such gifts for some time to come.

THE BIG BASIN
REDWOOD PARK.

Since the last writing, a few citizens of California have done a great amount of work upon this project, and a great number of citizens have become seriously interested in it. Probably the meeting held in San José in the middle of July, under the auspices of the Executive Committee appointed at the initial meeting at Stanford University, May 1st, has been the most important single meeting. The attendance—by invitation—was good, and made up of representative people. It was there decided to indefinitely postpone any appeal to Congress to purchase the Big Basin Redwoods, because such an appeal might jeopardize the passage of the bill to purchase the Calaveras Big Trees; the proposed boundaries of a larger and a smaller park in the Big Basin country, were submitted; the chairman, Hon. William T. Jeter, was delegated to ascertain selling-price and secure option on the principal tracts desired; resolutions supporting our movement and passed by the American Association for the Advancement of Science, two other affiliated scientific societies, and by the American Forestry Association, in their recent sessions in New York City, were read, and it was decided to appeal, after the

option was secured, to the societies and citizens of California for money to purchase the park.

The option on 2,200 acres of the best of the timber and that in the greatest danger from milling was made out in October, and formally presented to the Committee on November 9th by the chairman.

In the mean time a wide-spread public interest had been created, not a little of it due to the frequent articles and notes printed by the Secretary of the "Sempervirens Club," a club organized to assist this movement.

Before the end of November, however, a distinct effort arose to secure purchase by the State Legislature. A bill has been drafted asking the State for \$250,000, to be expended in the purchase. The Southern Pacific Railway will support the bill, and the press of the State generally favor a park. Those who know best about such legislation believe the bill will pass in some form.

The *Sequoia sempervirens* is only second to the Big Tree as an object of interest to the nation and the world, and it would have been a fitting ward of the United States. Indeed, such was the desire of the people of Santa Clara and Santa Cruz Counties. If the State becomes the guardian of a redwood park, it should call on the trained foresters of the United States Division of Forestry for working plans for its care and management, and thus assure the good beginning that most of our citizens interested in this park desire.

THE CALIFORNIA CLUB'S PETITION. In this petition, addressed to Congress, Mrs. White, President of the California Club, asks that the great forest reserves be so administered as to meet the approval of foresters and produce a revenue. This is an aid invaluable to the advancement of true forestry in the nation, and will be so appreciated. The petition has over one hundred thousand signatures, and will do much to hasten the preliminary work of Congress in consolidating the Government work in forestry, and place it all under the control of the United States Division of Forestry—in other words, under trained experts.

FORESTRY IN THE EASTERN STATES. We can only call attention to a comprehensive report of the present conditions of the forestry movement in New York, New Jersey, Pennsylvania, Wisconsin, and Minnesota, by Professor V. M. Spalding, prepared by the Michigan Forestry Commission, and printed in *Science*, December 28, 1900. It gives the history of the

laws in each State, and finds New York the pioneer, with the best-developed body of forestry laws, with State forest lands under its control which have been purchased since 1885 at the outlay of \$3,000,000. Pennsylvania and Minnesota are especially worth studying, on account of the effective forest-fire laws worked out by those States.

NEW YORK COLLEGE OF FORESTRY. Director Fernow's annual report shows a normal growth in students and a large amount accomplished in the college forest in the Adirondacks. Seventeen students are enrolled for the full course in forestry, and about fifty students each term have been under the instruction of the college. In the College Forest, in less than two years, a survey of the property has been made, buildings erected, over a million seedlings raised, much burnt-over land planted with evergreens, and a small railway for logging purposes is now being built. The following extract from a letter from Director Fernow, under date of November 22, 1900, is significant:—

It will interest you to know that our operations are in full blast in the College Forest, we having succeeded in selling the entire crop of hardwood to manufacturers of wood-alcohol and staves, to be delivered during the next fifteen years, *with the expectation of making the experiment self-supporting*. The commercial question, at least, has been settled.

The italics are ours, as it marks, we believe, a new era in the history of State forestry in this country.

DIVISION OF FORESTRY PUBLICATIONS *The Progress of Forestry in the United States:* By Gifford Pinchot, Forester. *The Practice of Forestry by Private Owners:* By Henry S. Graves, Superintendent of Working Plans, Division of Forestry. Both of these papers are reprints from the year-book of the Department of Agriculture for 1899. Mr. Pinchot, in addition to his review of the salient features of the policy of tree and forest protection by the United States, from a period a little over a century ago down to the present time, gives a brief summary of private and State forestry. He also describes the various phases of the very practical work being done by the Division of Forestry, a considerable portion of which has been in formulating working plans for lumbermen and private owners of forests, with the hope of introducing a mode of handling forest products that shall not endanger future forest growth. He touches upon educational work, and upon laws affecting the forests. The article also contains a map of the Forest Reserves and some excellent photographs intended to illustrate the written topics. Professor Graves's paper contains a great variety of interesting information,

brought together through research and correspondence. The bare mention by the author of the name of Jared Eliot as the first person who is recorded as introducing in America a system of genuine forestry, in the treatment of certain of his estates in Connecticut about 1730, calls to mind a man who would doubtless have attained enduring fame had he lived after the beginning of our national existence. He was a grandson of the "Apostle" John Eliot, himself a clergyman with active duties for forty years, a physician of considerable skill, the owner of several estates, a keen student of science and of nature, publishing also several practical treatises upon agriculture and the management of estates. He was the friend of many men of distinction, and particularly of Franklin, whom he resembled in many ways. The practice of forestry in America may be proud of such a beginning, for it was by no mere accident that Eliot applied its principles to his woodlands.

Professor Graves shows that it had been the habit in New England from the earlier colonial times to carefully preserve certain woodlands in a way to secure generation after generation of woodland products. The present writer can recall many evidences of this in the New Haven region; indeed, he was born where a large open grove of the stateliest and largest sugar-maples he ever remembers seeing spread over gentle slopes and reared their great crowns on every side but in front. Traditions concerning some of them showed them to be not less than a century and a half old—indeed, some were older. They had been carefully preserved for the sugar product in spring and shade in summer. Over-drain of sap was never allowed, and they were given periods of rest at intervals of several years. This was a phase of forestry in so far as it was utilizing a forest product with due reference to its continuance and reproduction.

Most of the author's illustrations refer to fuel and timber products. The planting of trees on sandy wastes in Eastern Massachusetts was begun even as far back as 1750, and ship-timber cut from such tracts in 1810. He also refers to the practice long prevailing of carefully preserving "sprout-land" from which successive crops of wood were obtained once in twenty-five years. He next passes to the forestry plans based on modern principles, prepared by experts, for the great Biltmore estate in North Carolina, and the Adirondack forests of Seward Webb and W. C. Whitney. He also brings together information on practices to prevent fires, and methods of renewal by planting.

The Division is doing so much and so well with its resources, that its publications ought to be in the hands of all who read the BULLETIN.

YALE FOREST
SCHOOL.

A late edition of the course statement of the Forest School established by Mr. James W. Pinchot and his family shows that seven students registered for the forestry curriculum at the opening of the school in September, 1900. All but one are college graduates and come from Eastern universities, from Bowdoin College to the University of Georgia. Examinations for entrance to this school will be held at four places on the Pacific Coast next June, viz.: at Pasadena and San Francisco, at Portland, and at Tacoma. The faculty of this school has received a strong addition in Professor J. W. Toumey. Besides being an excellent teacher, he is the only one among the professors in the Eastern forest schools who has had wide practical experience in our Western forests and mountains. The best we can wish for American forestry is that her three schools — Biltmore, New York, and Yale — may be speedily overcrowded with students.

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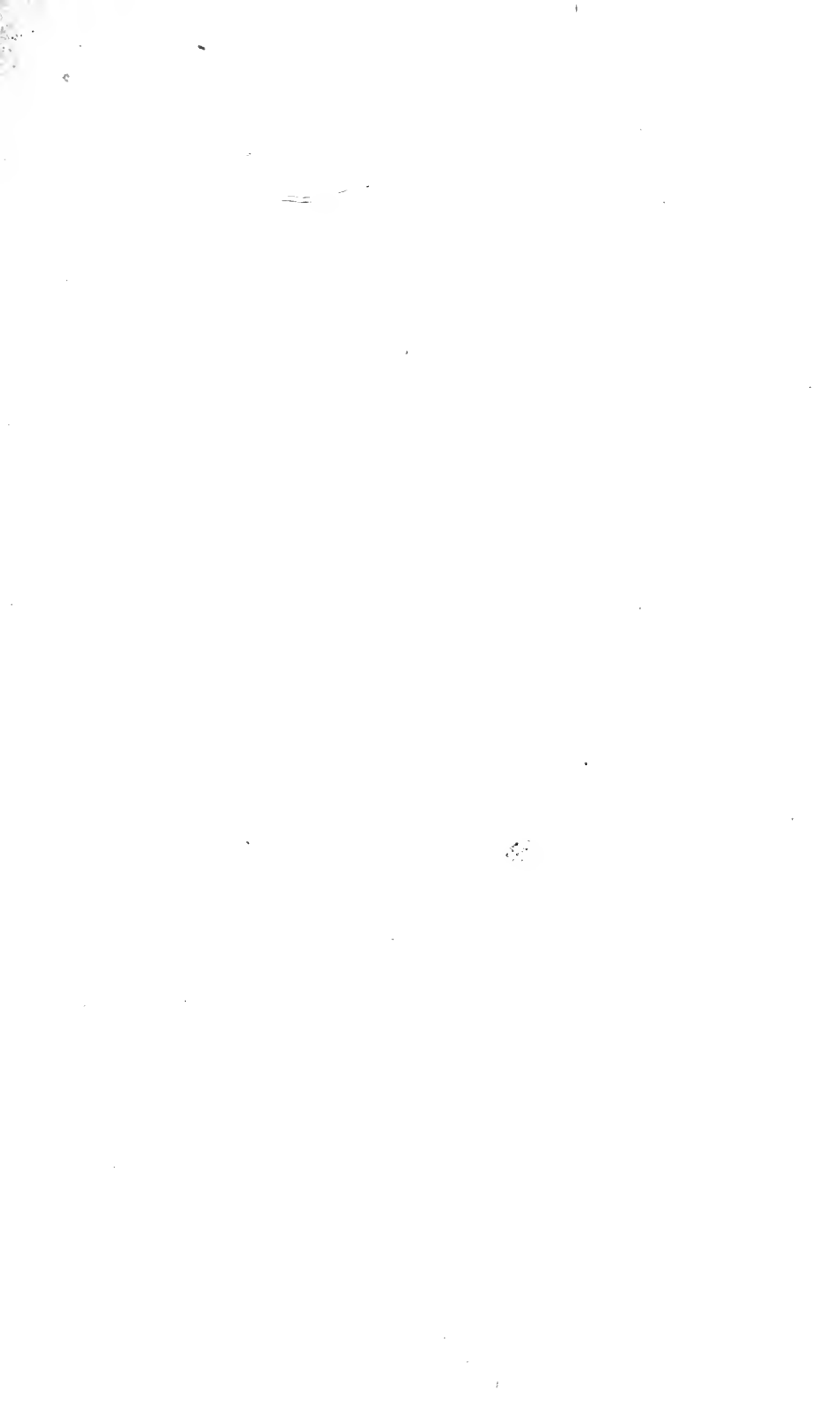
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All communications intended for publication by the SIERRA CLUB, and all correspondence concerning such publication, should be addressed to the Assistant Editor, J. S. Hutchinson, Jr., Sierra Club, Claus Spreckels Building, San Francisco, California.

Correspondence concerning the distribution and sale of the publications of the Club, and concerning its business generally, should be addressed to the Secretary of the Sierra Club, Merchants' Exchange Building, San Francisco, California.





MT. RAINIER.

SIERRA CLUB BULLETIN.

VOL. III.

SAN FRANCISCO, JUNE, 1901.

No. 4.

THE MAZAMAS ON MT. RAINIER.

—
BY E. WELDON YOUNG.
—

Any one who has ever done any mountain-climbing will understand that it rarely impresses two persons alike; so I may be pardoned if I do not relate the series of hairbreadth escapes and perilous adventures that have characterized some accounts of this mountain trip to the summit of Rainier. I confess to not having seen any places where if a man had gone fifteen feet he would have fallen three miles, and though there are many dangerous places on Mt. Rainier requiring unceasing care on the part of the climber, yet we did not see yawning crevasses every ten feet waiting to engulf us, nor were we kept busy dodging avalanches. Any mountain, and particularly Mt. Rainier, to a careless climber, is fraught with a thousand perils, and could not be recommended under any circumstances as a place to play golf or lawn-tennis.

To begin with, the Seattle contingent, which constituted the advance-party of the Mazamas, left Seattle on the steamer *Flyer*, Saturday, July 17, 1897.

At Tacoma we found the accommodating manager of the stage-line which was to carry us from that city to Longmire Springs, at the foot of the mountain, sixty-eight miles

away, awaiting us. Our baggage was promptly transferred, packed safely, and at 11 A. M. the big four-horse stage, driven by genial Jim Kernahan, one of the most capable, careful, and companionable men who ever held a line or cracked a whip, rolled out and up Pacific Avenue. We stopped for luncheon at Sparaway Lake, thirteen miles out of Tacoma, and that night reached Eatonville, twenty-four miles farther, dusty and happy. At Eatonville we had a most interesting view of Mt. Rainier, as from this point the three peaks—viz: Crater Peak, Peak Success, and Liberty Cap—show clearly, and so change the appearance of the summit that we could scarcely realize that it was Rainier. The next morning we started early, Mr. Curtis riding ahead to get views of the Mashell River, a beautiful mountain stream, from whose icy waters the delicious trout eaten the night before had been taken. How we enjoyed that morning ride! and had it not been for several miles of very rough corduroy there would have been nothing to mar its pleasures. During the day we passed Meta, Elbe, and Ashford; crossed numbers of small streams, following the road as it winds in and out through the beautiful evergreen fastnesses of the Rainier Forest Reserve.

We lunched at the home of our friend and driver Kernahan. His is a beautiful country-place, with its great barns, orchard, well-tilled fields and meadows, and trout-pond full of the speckled beauties. The chicken dinner served by Mrs. Kernahan was voted the best of the trip, and it was with genuine regret we heard the shout "All aboard!" and left the attractive shade and restfulness of this delightful place.

For several miles after leaving Kernahan's the road was excellent, but soon became rougher, and much of the way, a distance of twelve miles, we walked. When nearly to the Springs the wheel of the stage struck a stump, breaking down, and we had to walk, members of the party carry-

ing to Longmire's such articles as we needed for the night.

After dinner we examined the Soda Springs and mineral paint beds, for which this place is noted, and went early to bed, thoroughly tired, but still happy.

Early next morning, the stage with our baggage having arrived, we started up the mountain trail leading through the valleys of the Nisqually and Paradise Rivers, Curtis and Ray staying behind to see that our baggage was safely packed and started on the ponies which were to carry it over the mountain trail to Camp of the Clouds. The trip to Camp of the Clouds in Paradise Valley proved one of unalloyed pleasure, and we enjoyed every foot of the seven miles. This climb should always be made a feature and never an incident of the trip to Rainier, and plenty of time given for its enjoyment. Crossing the Nisqually River, we soon passed Crater Falls and a succession of smaller cascades. Now and then we caught glimpses of the mountain, to be followed immediately by a chorus of "Ah!" as we feasted our eyes on its matchless beauty.

Splendid as our trip thus far had been, it was all soon to be eclipsed by the beauties of Narada Falls. We heard the sonorous roaring of its falling waters as it dashed and tumbled over the cañon walls to the valley two hundred feet below, long before we reached them. Narada matches the beauty of Seattle's pride, Snoqualmie, in the glory of its rainbows, its mist, and its music, and makes a picture that is most indelibly photographed on the plates of memory, gushing forth, as it seems to do, from the solid bank of evergreen river above. Soon after passing Narada, we had our first glimpse of the fields of Rainier lilies, or the *Erythronium montanum* and *Erythronium grandiflora*. What a lovely sight they were, dancing merrily in the breeze which wafted their delicate perfume to our nostrils! It seemed a sacrilege to crush them under our feet in passing.

We reached Camp of the Clouds about 5:30, and were met by the smiling face of Capt. Skinner, who looked after the interests of our interior department in such an acceptable manner.

Tuesday and Wednesday we "trained" for the mountain climb; ate, photographed; ate, coasted down the steep field, and ate again; and Wednesday moved our camp from Camp of the Clouds to the permanent camping-place, called Camp Mazama, across Paradise Valley, near Sluiskin Falls,—after which we ate again. Our appetites must have reminded the cook of Mrs. Partington's Ike, of whom she laconically remarked that she never believed in the bottomless pit until she tried to fill Ike up on pancakes.

Thursday night a mist and a rain-storm settled down on the mountain, making everything wet and disagreeable, and all day Friday the members of the main party came straggling in wet and tired, we going out to help the weary ones, while the ladies of our advance-party provided those coming in with all the dry clothes they could spare and invited them to the warm fires of their tents and the hospitable folds of the big Sibley. What a treasure that Sibley was! All the afternoon the mountains had lain heavy with fog, and some of the party were beginning to feel concerned about one of the climbers who had come in the night previous, and against the advice of those best acquainted with the mountain, had determined to climb the mountain alone. About 2 P. M., two of us, prepared to go out and search for him, but when nearly ready to start, the fog began to lift a trifle and we concluded not to; but about 9 P. M. it was decided to send out a rescue-party. The prospect was not an alluring one,—a dense fog, an icy air, and a fierce gale that seemed strong enough to almost carry you off your feet, and the fog so thick that we could not see twenty-five feet; but we felt that a man's life was in danger, so there was no grumbling, and those of the party who

were to remain in camp vied with each other in showering us with offers of warm clothing and other comforts. We arranged for a system of signals by firing guns, selected a second rescue-party that was to come after us in case we did not return by daylight, took lanterns, life-lines, and a light lunch, and I provided myself with whisky, digitalis, and such other remedies as were most likely to be needed in an emergency. We left camp about 9:30 P.M., the whole party turning out to bid us good-by, wish us good luck, and give us a parting cheer. Professor Anderson, of Walla Walla, and the Rev. Earl Wilbur, of Portland, accompanied us to timber-line, where they started big beacon-fires to guide us into camp should the fog lift. After reaching the glacier above Sluiskin Falls we heard response to our hallooing from toward the Cowlitz Glacier, and greatly to our joy found that it was the missing man, who had given up the effort to get into camp, and made preparation to pass the night, sheltered by three rocks which he had rolled around a place scooped out in the snow. We had some trouble getting to him, as we got "pocketed" by a steep ledge of rocks and ice near the top of Paradise Glacier, out of which we had not a little trouble and danger climbing. We found him about two miles from camp, and after some difficulty succeeded in finding our way back to the bonfire, and from there to camp, the whole party turning out *en masse*, yelling and cheering in a very enthusiastic manner.

Saturday morning, a party of about twenty went to Pinnacle Peak. This peak, about 8,000 feet high, is the highest peak in the Tatoosh Range, and is known as the "Matterhorn of the Cascades," the crest of the peak rising sharply, giving the ambitious climber some pretty alpine work getting up its steep sides.

Sunday was spent in preparing for the ascent of the mountain, which was scheduled for the following morning.

Religious services were conducted by the Rev. Joel Martin, of New York, in the morning. Five of us made a preliminary trip during the day to Camp Muir, at the 11,000-foot level, for the purpose of selecting a route, lunching-places, and camping-place, and to locate places where water could be found for the thirsty climbers next day. We had a most delightful climb and a magnificent view of the Cowlitz Glacier, getting back to camp before dark, and enjoying some excellent coasting on the steep snow-fields below Camp Muir, near where poor McClure was killed two days later. Reaching camp, we found that the outing committee had selected Mr. Curtis to guide the party, designate the route, etc., while I was to have command of what was styled the "Mazama Battalion," which was comprised of several companies, and to bring the party along as Curtis might direct.

Sunday evening a general meeting of the climbers was called. Mr. Curtis told the party what each must do who went with us. Discipline was to be maintained and orders obeyed implicitly; climbers must keep place in line; no straggling would be permitted; stimulants must not be used while climbing; all the women must wear bloomers; and minute directions were given as regards the preparation to protect one's face and eyes from the dazzling brilliancy of the snow-fields. Mr. Curtis proved the right man in the right place; a better selection could not have been made. Had it not been for the splendid qualities of leadership which he displayed, his careful attention to details, and his cautious foresight in avoiding many perils of ascent, it is certain that but a small percentage of the Mazamas would ever have reached the crater, and in all probability several lives might have paid the penalty of their daring. He deserved and received the lasting affection and gratitude of every member of the party. Parenthetically, I may add that the same year that we climbed some seven different parties tried the ascent and but two reached the crater.



CAMP MAZAMA—MT. RAINIER.



THE START—MT. RAINIER.

THE ASCENT.

Reveille sounded at 5 A.M. Monday, and every one turned out to get breakfast, fix packs, and prepare for the long, hard climb. The ascent of Mt. Rainier is made from the south side. The small peak seen on the eastern slope from Seattle is an immense ledge of rocks running downwards and to the east of Gibraltar. We found upon rising, that a number had concluded not to join the main party, but to go on alone.

The main party, sixty-six strong, left Camp Mazama at 8:50, and began the long tedious climb over the ice-fields to Camp Muir. Such a party! They would have proved a star attraction as a part of a "Calithumpian parade." Each seemed to have his or her own ideas as to the proper method of guarding himself or herself against the onslaught of sun and snow. All sorts of headgear, veils, and hats were worn; some with faces painted white, others black, still others with faces covered with pink theatrical grease-paint. All wore goggles; all carried alpenstocks. The men wore knickerbockers; the ladies, bloomers. All were provided with sweaters. It is no wonder that old Rainier surrendered to such a pirate crew.

Curtis led the way, selected our route, and the writer gave the necessary military commands to stop or start the "battalion," endeavoring to regulate the rests so that the weaker climbers might not be too easily discouraged. These breathing-spells also gave us opportunity to enjoy the wonderful panorama of crag and cliff that with ever-widening horizon was spread before us. We lunched alongside a snow-stream a mile or two above McClure Rocks, and continuing the ascent reached Camp Muir in time to select a place for our beds among the bowlders, get our supper, and get into our sleeping-bags just as the sun was sinking to rest behind the cliffs of "The Cleaver." Ordinarily one cannot leave one's sleeping-bag at Camp

Muir after sundown without suffering from the chill of the mountain wind; but fortune smiled on the Mazamas, and the night was comparatively — comparatively, you understand — balmy, and we found it much pleasanter than we anticipated.

What a beautiful night it was ! Never, it seemed to me, had I seen such a star-studded sky. Certainly it was a heaven of peace, of beauty, and of glory, that canopied us that night at Camp Muir. About 10 o'clock a red light was burned and a reply received from a point thought to be Ellensburg. Before 4 o'clock next morning we were up at our breakfast, and about 4:30 started up the boulders, over the ice-fields and rock-slides of the Cowlitz Cleaver, using the life-line at the most dangerous places. On we went, up, up, up, passing Camp of the Stars, Camp Shivers, and Camp Misery, the climbers divesting themselves at nearly every halting-place of what they considered superfluous clothing, an opinion which was changed when we reached the great snow-fields above Gibraltar, where the keen, icy mountain wind almost froze the breath in our bodies.

Gibraltar was reached about 11 A.M. Here some of the party turned back, giving up, as others had been doing at frequent intervals ever since leaving Camp Muir. Life-lines were placed in position around the rocks by Mr. Ross and Mr. Curtis. Gibraltar is considered by most climbers as the most perilous place in the ascent. One man tried it each year for five successive years before he was able to control his nerves sufficiently to pass. High above our heads, 1,200 or 1,500 feet, it towered, an almost perpendicular wall of rock, while the narrow ledge around which we crawled, varied in width from a few inches to several feet. At the point where the life-line was placed it shows no flat surface whatever, climbers depending upon the life-lines and a few small projecting points of rock.

A slip here meant certain death in the cañon below, which stretches away into the icy caves and crevasses of Nisqually Glacier.

The view of Nisqually Glacier, to one whose nerves are steady enough to permit looking down into its icy beauties from this point, is grand beyond description — great walls of ice and snow, huge caverns and crevasses into which frequent avalanches from the cliffs above go thundering down, down, down, their reverberations echoing from rock-cliff to ice-cliff again and again. To my mind, Nisqually Glacier is the most attractive, interesting, and wonderful point on the mountain.

So far as the danger of Gibraltar is concerned, it seems to me to have been exaggerated; the climb up the ice-ledge just beyond, on the treacherous ice and snow-fields between the crater and Camp No Camp, is much more dangerous. Our party passed Gibraltar safely, and as I stood there balancing on my alpenstock, which was firmly wedged into a crevice of the rock, reaching out my hand to help the party across, I could not but notice that the ladies in the party in most instances were as cool, if not more so, than many of the men.

Gibraltar having been passed in safety, we were yet in constant danger until we got on the snow, from the falling rocks, which, loosened by the alternate action of sun and frost, kept constantly dropping. One large one narrowly missed me, and others had similar experiences, Miss Fuller, of Tacoma, being struck on the head, causing her to fall, but she was quickly up and kept pluckily on to the summit. Soon we were climbing up the ice and snow beyond Gibraltar, where it was so steep that not only were the life-lines in constant use, but steps had to be cut with the ice-axes. About noon we reached Camp No Camp, just above Gibraltar, and here stopped for luncheon. This camp will be known in the future as Camp McClure, from the fact that

Professor McClure spent his last night on earth at this point. His party had not been able to make the summit the day before, as planned, so remained here for the night, leaving early next morning for the crater.

At 12:30 the command "Battalion, attention! Forward! March!" was given, and we were again *en route* for the summit. All were now feeling the effects of the high altitude. I gave the party short but frequent rests, usually about twenty or twenty-five steps between halts. Some began to have nosebleed, and some were nauseated, but none thought of giving up the effort. The life-lines were in use constantly, as the melting snow made a thin sheeting of ice, which was most treacherous. None were allowed to sit down, as rising from a sitting posture makes one specially liable to slip, and orders were given to rest only on alpenstocks. Half-way from Camp McClure to the crater we met the Mitchell-McClure party returning, and here Professor McClure attached himself to our party and returned to the summit to make further scientific observations. Returning, he kept with our party as far as Camp Muir.

The wind at this point of the mountain is terrific, both in velocity and iciness. The ice-fields were so hard that in many places it was almost impossible to kick holes in the crust for the party to step in. These ice-fields are unquestionably the most dangerous part of the ascent, as a slip here, unless one is firmly secured to life-lines, means certain death.

All were now very cold, and some of the men, thinking they could stand the icy wind better, took off their coats and put them on the ladies. The men also assisted those who seemed to require it, and at 3:50 we wearily climbed up and over the scoriæ and rocks and down over the protecting rim of the crater, on to the warm rocks below.

The summit consists of three peaks, the central being Crater Peak, with Peak Success to the south and Liberty

Cap to the north. And what a view! 14,528 feet above the sea! Snow-clad peaks were all about us — Hood, Adams, St. Helens, Baker, Stewart, and Jefferson. All were beautiful, yet the regal grandeur of Rainier's snowy crest eclipsed them all. On every side, range after range in endless succession stretched their billowing mountain chains of peaks. Pinnacle Peak, to whose summit we had so proudly climbed a day or two before, was dwarfed into pigmy insignificance. Away to the west the hazy outlines of the Pacific Ocean could be seen, while Puget Sound looked like a scroll of molten silver, outlined as it was in the emerald setting of the evergreen forests of Western Washington. To the south, west, north, northeast, and east the great ice-rivers of the Nisqually, Puyallup, Carbon, Cowlitz, Paradise, and Stevens glaciers could be distinguished as they moved downward to mix the water of their melting ice-coat with the salt of the sea. The view was worth all the hardships and perils of the climb, and few there are, I think, who stood that day with that splendid panorama of mountain, forest, and sky spread out before them who do not long to go again. But our time for enjoyment was brief. The Mazama business meeting was called to order in the crater by President Pittock, and those who had made the ascent were elected to membership. Mr. Curtis photographed the party and we all registered. A number of the party passed the night in the crater, and burned calcium-lights, which were seen at Seattle and Tacoma.

Fifty-eight in all made the summit, fifty-one being with the main party, guided by Mr. Curtis.

After registering, we got the party together as quickly as possible, and started down at 4:40 P.M., some delay being caused by several afflicted with mountain sickness. Mr. Curtis was again in charge of the life-lines, while I took my place in the center of the column, to give the necessary commands and to enable me to assist one of the young

ladies, who was too weak and ill to walk unattended. The trip from the crater to Gibraltar was terribly cold, but was made without special incident until we reached Gibraltar, where in trying to pass, Professor Anderson, of Walla Walla, slipped and narrowly escaped falling to his death in the cañon below, and carrying Mr. Parsons, of Chicago, with him. After passing Gibraltar we hurried on over the rocks and rock-slides of the Cleaver, reaching Camp Muir at 9:30, where the party divided, some staying at Camp Muir all night. Others concluded to go on down to Camp Mazama, the lights of which could be plainly seen. About twenty minutes before starting I noticed Professor McClure and a small detachment that were with him leaving, and called out to them to wait, that our party, with Mr. Curtis to guide us, would soon start, and they would be safer if they waited. Other members of his party have since told me that they did not hear this warning. In any event, they did not wait, and poor McClure went on to his death.

We followed shortly but could not go as rapidly as they, as we had one or two sick ladies. About 1 A.M. we met some of the members of the McClure party, who told us that it was feared that Professor McClure had fallen into a crevasse. A little later we met Messrs. Ray and Van Trump, who were out with lanterns. They piloted us across the narrow ridge below McClure Rocks, and from there on we had no trouble getting into camp, which we reached at 4 A.M., having walked almost steadily for twenty-three hours. About 7 o'clock we saw the rescuing-party bringing in poor McClure on a stretcher.

In the afternoon Mr. Curtis and I took our alpenstocks and went up to the rocks over which the Professor had fallen. He had slipped on a high snow precipice about two hundred feet east of the huge pile of rocks called the Sphinx, situated a mile and a half above Camp Mazama,

toward Camp Muir. These rocks are now rechristened McClure Rocks. He called out to Miss McBride and others of the party, warning them not to come, as it was too steep, and probably very soon after slipped and slid with tremendous velocity to the cruel rocks two hundred feet below. He struck head first, and was undoubtedly instantly killed. The body bounded about thirty feet after striking, and fell among the boulders. Had he gone fourteen feet farther east he would have missed the rocks entirely. His death is the first and only fatality to occur on Rainier, and many will blame him as reckless, yet at that time that part of the mountain was one of the safest, although Mr. Curtis, who remained on the mountain in photographic work for a couple of weeks longer, informs me that many new crevasses opened up at that point after our party returned. Undoubtedly his death will be a warning to others, and if it shall prove the preservation of other lives, it would be the death that Edgar McClure would have wished to die. He was a manly man, unselfish in his nature, devoted to his friends, thoroughly scientific in his tastes and inclinations, of spotless reputation and unsullied character. To have known him was to have loved him, and the world was better for his having lived.

We now began to worry about the crater-party, which had stayed to burn the red light and also to attempt certain scientific observations, using kites which had been carried up to help them in their work. Fortunately but little of the scientific data secured by Professor McClure was lost, and his measurements of the height of the mountain, 14,528 feet, a slight increase to that which has been heretofore given, will probably stand in the future as the scientific and correct height of the mountain, for the instruments which he used had been specially sent from the Smithsonian Institution, had been carefully tested before leaving Washington, tested again at Portland, and simultaneous

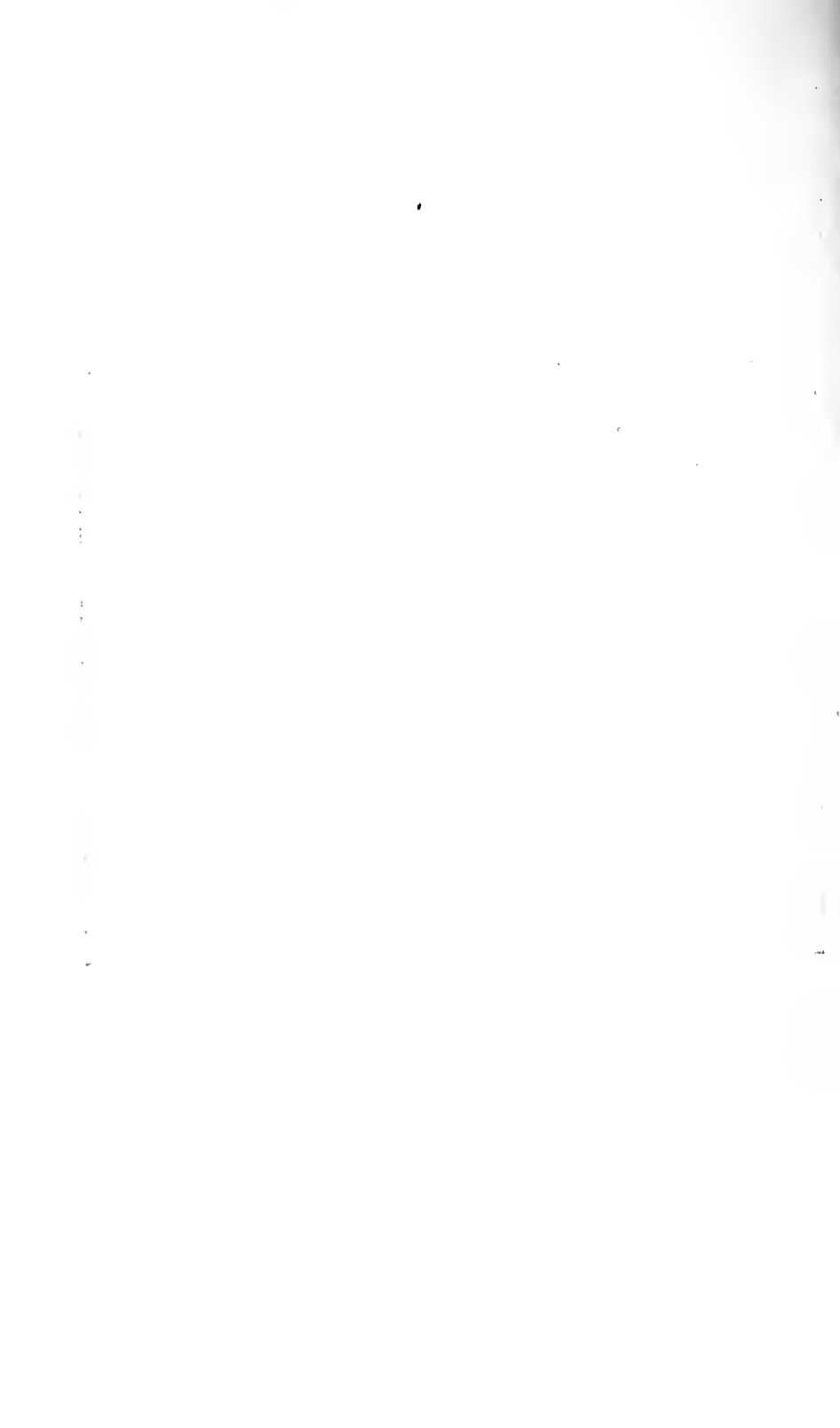
barometric observations were conducted the time of the ascent, at Seattle, Portland, Spokane, Walla Walla, Pendleton, and Baker City, and his readings corrected by Professor McAllister, of the Oregon State University, from the data thus obtained.

Late Wednesday evening we could see through our glasses the crater-party slowly descending the ice-fields above Gibraltar, and we hoped that they would take warning and not try to come from Camp Muir that night. We knew that they would get word of McClure's death from another party, who went up Wednesday, and who, when they got to the summit, were compelled to stay in the crater two nights, as the wind was so fierce that it blew them back as soon as they climbed to the crater's rim.

All Wednesday evening we sat around the camp-fire, discussing the accident and the varied experiences of the ascent, but at 11 P.M., hearing no shouts and seeing no lights, we concluded that the crater-party were not coming down. However, I stayed up until 11:30 and kept watch, thinking that possibly some of them might make the attempt, when I too went to bed. Hardly, it seemed to me, had I fallen asleep, when Mr. Ross came to my tent and asked if I would lead a rescue-party to get a man out of a crevasse. Dressing as quickly as possible, and taking with me medicine and stimulants, I hurried out and found five of the party awaiting me. Inquiry developed the fact that word had just arrived by Mr. H. S. Ainsley, of Portland, that Walter Rogers, also of Portland, whom he had accompanied in the attempt to make the descent from Camp Muir, had slipped on a snow precipice east of McClure Rocks and fallen into a crevasse. Ainsley too had fallen, but fortunately for both of them he struck the crevasse near the end and had not gone down more than ten feet, and though stunned, cut, and bleeding was able to crawl out and bring word for help. He was so hysterical from fatigue, hunger,



CAMP MUIR — MT. RAINIER.



and danger that we felt but little confidence in his ability to locate the crevasse. Yet had he not been so weak and exhausted, we should have taken him along, but it was felt that he would deter more than help. Taking life-lines and lanterns, we started out at 12:30 A. M. Fastening ourselves to the life-lines, we hurried as fast as possible, shouting at frequent intervals, not so much with the idea of getting a response as hoping that the sound might reach Rogers and let him know that help was coming, so that he would not give up his struggle for life, if he were yet alive. Reaching a point about 150 yards east of where McClure was killed, we shouted, and received an answer that seemed to be a half or three quarters of a mile up the mountain. We shouted again and started forward but a few steps, when we discovered a crevasse about ten feet ahead of us, and very much to my surprise, too, for Curtis and I had been over this snow-field the afternoon previous and had not seen it, and we were positive that there could be no crevasse there. We hallooed again and again, were answered apparently from above, and some of the party wished to go up at once, but we concluded to examine the crevasse first, thinking it might be that it was another member of the party whom we heard shouting. One of the party climbed up to this crevasse, called down, and was at once answered by Rogers, who was within twenty-five feet of us, though his voice from the crevasse sounded fully three-quarters of a mile away.

He was still conscious, though partially delirious at intervals, and begged most piteously for us to save him, insisting that "more than a hundred men had come up to the crevasse, looked down and gone away again without helping him." He had been in this icy prison about two or three hours, and could scarcely have lived an hour longer. He was down about twenty-five feet, wedged in solidly, his pack on his back, his right hand and arm

wedged firmly against the ice, his left arm free. Quickly we made a noose on the life-line, told him to slip his left arm through it and place it over his right shoulder, instructions that had to be repeated again and again, on account of his semi-delirious condition. We then took two or three half-hitches about an alpenstock, caught an ice-hook into his pack and pulled away. Two or three times the hook loosened, and we thought we should have to let a man down to help him, but finally got him out in about thirty minutes without doing so. He was thoroughly chilled, unable to stand, and his right arm was numb and useless. His body was shaking so that it was with great difficulty he swallowed the brandy which I gave him. He had to be supported constantly until we got into camp. We soon, however, had him comparatively comfortable and asleep between three and four o'clock. I too got some rest, and as I had had but little over three hours in three days it was not unwelcome.

Friday we rested, for we were all worn out with the fatigue and excitement of the week. Many of the party went up and examined the crevasse in which Rogers was found. Mr. Curtis secured a picture of Mr. Van Trump standing on the ridge near Sluiskin Falls, upon the exact point where he and General Stevens had camped when making the first ascent of Mt. Rainier twenty-seven years before. Other pictures were taken, one showing the party at Camp Muir lying in their sleeping-bags on the rocky slopes of the Cleaver, and one the party climbing the steep incline of the snow-fields, which is characteristic of the climbing found not only on Rainier, but on Pinnacle Peak.

Mr. Curtis was particularly fortunate in his photographic work, and after watching him day after day climbing with his camera to points that seemed almost inaccessible, that he might get just the view he wanted of a certain portion of the mountain or glaciers, I ceased to wonder how he

succeeded in getting the beautiful views seen in his galleries — the finest specimens of mountain photography I have ever seen anywhere, East or West.

Saturday morning the Mazamas made an excursion to Nisqually Glacier. As indicated before, this glacier is one of the most wonderful places on Mt. Rainier, and the one who fails to visit it misses more than he is conscious of. It is one of the few living glaciers having a terminal moraine. It has a movement of twelve inches every twenty-three hours. Starting from the base of Gibraltar, it slopes away in a southeasterly direction in an endless succession of caves, caverns, and pillars of ice and snow, its crevasses deep and dark, the beautiful blue and green of their ice-walls shading into the inky darkness of unknown depths. Many of these crevasses are so deep that falling stones give no sound when reaching the bottom. We timed one in which it took eight and one-half seconds for the rock to strike. Wild and treacherous as are its windings, it has a charm indescribable, and I am sure that none who spent that delightful day in its study and examination but wish to revel once more in its weird and silent beauty. Steadily downward day after day, month after month, century after century, it pushes on, depositing its rocks and dirt as it moves, its silence rarely broken except by the rush and roar of the avalanches.

Saturday night we gathered in the big Sibley and sang songs and told stories until a late hour. The following day we broke camp and started homeward. Two days later we were at our homes, and the most successful outing ever held by the Mazamas was at an end.

LASSEN BUTTES;

FROM PRATTVILLE TO FALL RIVER MILLS.

BY MARTHA WARREN BECKWITH.

Up in the northwestern corner of Plumas County, lapping over into Shasta, lies a bit of country that seems but lately fresh in the making. Indeed, this region is said to exhibit the most recent lava formations in the State, if not in the whole West. The famous little Hot Spring Valley is there, stretched just at the foot of the Lassen Buttes, which rise in air 10,437 feet, pushed up by that tremendous force which made for landscape in the plastic ages. Surrounding the Buttes are cinder-cones, a number following the same trend, great lava-beds, hot springs and smoking chimneys,—a perfect conglomerate of diabolical symbols that only a geologist could tame into logical coherence. The valley itself is shaped like a funnel. It spreads out at the foot of the Butte bluffs, is almost encircled by lower hills, but breaks through and wears away to the south down a picturesque stone-walled valley, which gradually widens and drains indirectly into the Big Meadows.

In company with Miss Annie M. Alexander I visited this valley in the summer of 1899. In the Greek days a temple to Apollo, a sacred tripod, oracles, and a deal of non-committal soothsaying would have centered around such a place, so evidently close is its connection with the secrets of the underworld; but in our own less credulous age the valley becomes a picturesque speculation, the property of one man, who farms a little and acts as guide to the summer tourists who make their way thither.

Our first meeting with Mr. Drake was in Prattville, a small town of the Big Meadows, where we tarried a few days to make preparation for the trip. He drove down from the valley to join in the festivities of the Fourth, and we came upon his camp one evening haphazard, by following a small thread of smoke among the trees. We found him just preparing his evening meal. His wagon stood by, the horse picketed and nosing in a bag of grain. The little fire was laid upon the ground. On it stood coffee-pot and frying-pan, and Mr. Drake himself sat on a log smoking away the mosquitoes,—a stalwart figure of a man something past middle age, with the kindly, frank look to him that a life on the hills breeds into a man.

Permission for entrance into the valley having thus been gained, we started out next day on the Red Bluff road, skirted Big Meadows, entered the wooded divide, and turned off presently into Warner's Valley, which enters the Hot Springs at its upper end. We rode all day, and it was very warm. Some dairymen half-way up furnished us with lunch and a few supplies; but the hens refused to lay us eggs, and the day's baking had been meager. About four we came out into a widening between the hills, and rode our horses up into a wooded recess beside a sparkling brook. As their heads pushed aside the light undergrowth, we looked up through the vista of oaks and saw a pair of antlers, a deer's delicate nostrils turned toward us for a second, and then the creature disappeared.

Here in the haunt of the deer we camped for the night, but unfortunately met with a multitude of less timid mountain vagrants in the shape of swarms of mosquitoes, whose hum sounded all night in our ears, mingled with the brook's ripple and the stamping of our horses' feet. Just where we laid our bed for the night a fine specimen of the snow-plant had thrust itself up, as red as a rose and sturdy as a pine-tree. The whole region was rich in flowers, and I filled my press the next morning.

Before we slept we amused ourselves by giving the ponies a vigorous souse in the clear creek that ran wide from our green recess. We rubbed them down handsomely, although they did not like it, standing in the stream ourselves and dashing water over them,—I from a tin pail and Miss Alexander from the tea-kettle. They looked pretty wet at the end, but sweetly clean. With a splendid glow of pride, we watched them emerge from the bath. They trotted up the bank, put noses together an instant, and then down plumped those two tidy nags on their knees, rolled over in the dust that lay thick, dry, and warm on the level, squirmed vigorously for a season, and came up perfectly contented with themselves, howbeit they looked the two most disreputable little beasts this side the sand-plains.

We were fortunate enough to find a family of summer campers already lodged in the valley at the entrance to the Hot Springs. Their fresh, clean-smelling cabin, chopped out of a giant pine, and pretty enough for a king's summer-house, was set in a pine grove close by the swathes of meadow-land that bordered the creek. Jim Kelley, the grown-up son, knew the country well, and we engaged him to guide us the first day's journey up the Buttes. It was about twelve the next morning when we got started for the seven-mile climb. In the valley we passed Mr. Drake's neat frame cottage, crossed a field of timothy, took a drink at the sulphur springs, and visited the Devil's Kitchen. This lies in a hollow at the right-hand angle of the valley, where a mighty pother of boiling and stewing is still going on. Smoke roars from "the chimney" at the farther end, and the ground is strewn with pot-holes of boiling clay, bluish and oily-looking, so numerous that it is dangerous to step unwarily. In some places the soil looked bloody, as if devil's work had been done there sure enough.

We got up the steep wooded bluff overlooking the valley, then passed by a sloping way through fine forests

of fir, tamarack, larch, and mountain pine. We saw here some of the finest specimens of these trees that we encountered throughout the trip, graceful shapes all, and growing to unwonted size and into splendid symmetry in the more sheltered levels. As we got farther up, the heights of the trees decreased and they took on a sturdier, stockier form as if bluffing the cold. Just below the summit, the tamarack, which stood a stately tree on the low levels, crept along the ground, twisted and bent with the weight of the winter snowfalls, its needles stiff, wiry, and close-cropped. We crossed green meadows starred with cream-colored buttercups, where the path was lost in the ooze, flooded as they were with the spring thawing. A dashing brook made fine foaming waterfalls. One big pond, backed by the white Buttes, was vociferous with frogs. "Spring has only just begun up here," explained our guide.

Our camp was pitched in the highest meadow, where a few snow-drifts still lay on the ground and a few grass-blades pushed their way up reluctantly, as if a March rather than a July sun shone down upon them. Here our guide commended us to the solitudes and left us to make our way up the Buttes the next day as best we might. We cut a huge heap of fir branches, built a fire, melted snow for our coffee, and proceeded to lay the table for dinner. The bread had just reached the critical point in its baking, the rice and canned meat were already served, the coffee-pot sang, and we had begun to lick our lips like hungry animals, when suddenly we heard a stampede down where the ponies were tied. We ran to the brow of the hill and looked over. There we saw our two faithless steeds disappearing down the trail, manes tossing, noses defiant, the smell of the green meadows of the lowlands in their greedy young nostrils. We gave chase after them, remembering the long road up which we had toiled that day. When we ran the ponies trotted, and the little brutes dared us to the

race with the good-nature of conscious superiority. It was a good mile we followed down the mountain, and then it was rather greed than conscience that gave us the lead,—a green meadow lured them aside. We rounded them up and led them back in triumph to camp, where we saw well to their picketing before returning to our own cold supper. Hungry as we were, the air was so clear and bracing at that height that we felt no whit wearied by the exercise.

That was a magnificent still night up there on the mountain. We built up a fine bonfire on the brow of the bank above which our camp was spread, and it threw great flickering streaks of flame into the vast darkness of the mountain-side. The fir-trees ceased presently to make blots of black against the mountain, but always the sky kept some hint of light, spread as it was with stars which stare very big at that altitude. As we lay under our blankets in the little round cabin of larch-trees that nature had grown for us, we heard the mountain wind coming swiftly through the firs, and once in a while the hunting-cry of a night-bird startled us. But the whole air was insect-still. A star fell as I closed my eyes, and the next thing I knew the birds were singing cheerfully and the sun was awake, although it was scarcely five.

After breakfast we were off for the mountain-top by a rough trails which we presently had to follow rather by instinct than sight, for by this time we were up in the snow-fields, and they lay remorselessly over the track, necessitating some hardihood in venturing out upon their crust. Fortunately a party had made the trip but a few days before, and in places we could distinguish the faint footprints of their horses in the melting crust. Soon, however, even this help failed us, and we found ourselves plunging across glaring white fields of snow into which our horses' legs sank sometimes to the knees, steering without compass toward the white, towering blade of the Butte which stood

up in the brave sunlight and dared us to come on. We stumbled about a good deal among confused ridges of tamarack and larch, the snow melted away from their boles, and finally, quite off the track at last, climbed a big mound of loose shale and tied our horses to a prostrate tamarack where they might find shelter from the cutting wind.

We had to cross a snow-field to get into the trail, the last two thousand feet of which had to be made on foot, along the edge of the peak where the great sheet of snow which covered its side had melted away and left the path accessible. The Butte here rises steeply out of the more gradual play of ridge and valley at its base, like a great claw thrust out of a beast's paw. The wind blew piercingly around the edge of the bluff, cold as at midwinter in the lowlands. The sun, on the other hand, was warm as summer and the air deliciously sparkling. The party ahead of us — President Jordan and his daughter, from the University of Stanford — had dropped nut-shells along the way as they mounted, and we followed them, like Hop-o'-my-Thumb and his brothers, a good deal cheered by this quasi comradeship. The last part of the climb was a steady ascent over loose shale, up which we slipped and stumbled losing a step for every two gained, like the famous frog of mathematical fame. Once we attempted to cross a sheet of snow, impatient of going around it, and the stunning sensation of whiteness, added to the steep, slippery incline, affected us with a sort of vertigo, from which we managed to recover, somewhat humbled and a good deal shaken.

There is a story, vouched for by our guide, that a young woman once thoughtlessly set foot upon the broad sheet of frozen snow that reaches from top to bottom of the peak. In an instant she went spinning down over the glassy slide and was shot into a heap of loose shale at the bottom, breathless but unhurt.

When at last we got up over the ridge we had just

breath enough left to utter simultaneously a shrill feminine shriek of rapture. There before us, beyond and out of the blue haze of the distant levels, rose Mt. Shasta, a perfect cone, snow-streaked about the summit, where it touched against the tremulous blue sky, lifted so high above us, as if drawing into itself and typifying in one Titanic upreaching the model form after which the multitudes of lesser hills might build their aspiration.

Over beyond Shasta, against the horizon, lay the Coast Range and the Scott Mountains, still dashed with snow. Beneath us was the Sierra. Cone upon cone they rose and fell away in long succession, swimming in a blue haze that brimmed the valleys and melted sky and land together at the far limit of the horizon. We could look back along the range and trace the course over which we had come. The eye followed the ridge we had just ascended, down past the frog-pond, and leaped over into the little valley whence wound Warner's Valley to the divide and the Big Meadows. That dim sea of sunny mist hemmed by mountains was the Big Meadows, from whose extreme border we had first looked upon the Buttes and the four conical peaks that lay picked out against the horizon to their right. They had looked as far away as dreamland then, the sunset light casting a strange, eerie shadow of red over them. We had quoted Poe, and our hearts had yearned after that dim country in the Far North. Now we had gained it, and lo! actual rock and earth, but the place from whence we came was now become a land of mist, shrouded in vague enchantment.

The hot mist rolled everywhere, mingling with the smoke of forest fires. Mountains were flattened by the height, and distant landmarks were impossible to recognize. The plain of the Sacramento Valley looked as deep below us as Hades. Near at hand, however, we could pick out lakes, and trace the ridges of the Buttes descending abruptly

at our right into a great stretch of timber-land, and to the left plunging down through the snow past a tiny basin of shining green water frosted with ice. Just below us was the dip of the crater out of which, maybe, the Buttes were heaped. In the bottom of the pool, at its base, we could see stones like pebbles lying. But always the eye returned and dwelt upon Mt. Shasta. As I look back upon that whole stupendous panorama, so wide in extent, unobstructed in outlook, monstrous in iteration, the thing upon which the mind fastens is, after all, the perfect cone that mounted still higher heavenward and set a limit and told us the gods still dwelt above.

We had spent three hours in reaching the summit from our camp, starting out at 7:07 and arriving at 10:10. Now for twenty minutes we crouched away from the wind and feasted our eyes upon blue infinities, then fled away down the mountain to where the ponies waited, and by twelve were back again in camp cooking hot pancakes for luncheon. Our hungry-eyed little ponies looked upon this performance with righteous indignation, and "Blackie" almost hung himself by way of protest;—rescued by Miss Alexander's prompt action with a jack-knife. Off at last, they fairly shot down the mountain, and had to be reasoned with for photographs and botanizing, so that by four o'clock they were wallowing in Mr. Drake's rank meadows, while we lay contentedly soaking in a hot mineral bath.

The next morning, promptly at eight, appeared Jim Kelley, and we bade good-by to Hot Spring Valley. Our plan was to skirt Cinder Cone and cross the dry plateau that lies between it and the Fall River basin, where mail awaited us at Fall River Mills. Those whom we asked discouraged us from the attempt because of the scarcity of water and of hostelry along the way, but we counted the miles and could not be deterred from this obviously shortest route northward.

That night we camped under a grove of tamaracks whose needles do not furnish the softest of couches. The rice cooked in water measured out by the spoonful was hardly digestible, and our horses grumbled at the bunch-grass in a discontented way that wore upon our nerves. Moreover it was cold, and there were a great many mosquitoes. Our next morning's breakfast consisted of a very small cup of coffee and one egg apiece—no bread. Visions of good things hung in the air before us as we crossed the plateau. Fall River Mills lay some thirty miles to the north; but to reach it we must make an angle across the flat and strike into the Susanville road that comes up from the southeast and follow the line of the mountains down the long slope of the plateau.

I do not recollect the distance from this point down the plateau to Blue Grass Hotel. I believe it is not more than six or eight miles, but, judged by my feelings, it might have been forty. I have seldom seen a more ravishing sight than those fields of waving timothy presented, the low, neat frame house with the wide veranda, and the long barns where our ponies might revel. Later we devoured poached eggs on toast and drank glasses of creamy milk, seated on this same porch with our host and his wife, and a small brood of children gathered by to make the most of visitors. Rarely have I encountered so jovial an entertainer as this big-bodied Dutch mountaineer with the clarion voice. We drove the whole distance from Blue Grass Hotel to Fall River Mills in a single-seated wagon drawn by a stout pair of horses, and this delightful man entertained us all the way with stories of tracking lost men through this waterless back country, and with Indian tales of the pioneer days.

The plateau which we were traversing descends into the basin of the Fall River by a succession of steppes,—first the sagebrush desert which we had crossed, then a wooded

stretch that enters the "Juniper Ridge," dotted with those shaggy, blue-berried evergreens, and thence the land slopes bare down the mountain-side, fronting a fine view of the valley, surrounded by low mountains, Mt. Shasta before and the Black and Lassen Buttes at the rear on the horizon.

Presently we were at Fall River Mills, our destination, a rather stagnant town, boasting however a flour-mill, two drug and three dry-goods stores, a blacksmith's and a harness shop, a post-office, two churches, and two hotels. It is superbly located at the junction of the Pit and the Fall Rivers, in the line, too, of a daily stage from Redding, and to our desert-wonted eyes it was a real metropolis.

ZONAL DISTRIBUTION OF TREES AND SHRUBS IN THE SOUTHERN SIERRA.

BY WILLIAM R. DUDLEY.

There are few regions where camping and traveling day after day, with a camper's outfit only, is a comparatively easy mode of life for the man of science, or even for the man of pleasure. The great forest belt of the Southern Sierra and the high alps above it, will always remain one of those few favored regions, because of the long rainless summer, the equable temperature, the woods, the waters, and the scene, and finally the ease with which the rider traverses the open upper woods and glaciated cañons. The convenience of having animals of your own during a stay in these higher altitudes will induce the camper for many years to come, to start from the valley or the foot-hill towns, by his own conveyance, and traverse as best he can the long hot western slope. It is a journey seeming more formidable than it really proves to be; the old and the very young have "packed in," as the phrase goes in the foot-hills, but we never hear they are the worse for it. In the Adirondacks and the White Mountains a slender white monument not infrequently marks a spot along a lonely trail, where the anger or the rigor of the mountains has descended upon and slain the unhappy pilgrim; but the Sierra, far higher and more rugged, are kinder.

Nevertheless, the eye of the mountain-climber from foot-hill start to finish, is fixed on the first fringe of pine woods far above him, and he chooses to see or remember as little as possible of the life of the chaparral slopes intervening.

Indeed they appear to him throughout the summer destitute of life. This is by far the most monotonous and hardest way to take the journey. There is much that is instructive, on the contrary; and if one can be interested in watching the daily movement of the fog on Tamalpais or the Santa Cruz Mountains, observing how it steals up certain cañons, avoids certain slopes, habitually overtops particular summits, and slides around others, he will be interested in the rather remarkable zonal distribution of the trees and shrubs as he ascends from the San Joaquin plain to the forest belt, about 4,000 feet above it. We may find certain plants, like the common river-bank alder, extending interruptedly from the plain far into the forest, but most species lie in belts along the mountain slopes, as marked as the belts of mean annual temperature themselves, which go far to account for the distribution of the plants. These zones of growth do not, in any locality, maintain an even level above the sea. They may ascend to a higher level in crossing a great hot cañon, and sink lower on the north slope of a dividing ridge. They may greatly widen in a favored locality, or narrow in an unfavorable one. In the Coast Ranges the fog is the visible daily expression of the subtle movements of the air in relation to the topographical contour. In the Sierra it would not be far wrong to say that plant belts expressed more fixedly the same relations, modified by the subterranean moisture, by soil and some other factors. Behind all these movements of the air and variations in the plant belts is the potent factor of total amount of available heat. But the distribution of this and the results of its distribution are varied greatly by the other conditions. The great sunny valley of the East Kaweah, acts as a flue, drawing up the air of the San Joaquin foot-hills, laden with heat, far above its normal level. Here we find the heat-loving gray buckthorn (*Ceanothus cuneatus*) extending considerably above 5,000

feet, while over on the north slope of the next divide, on the North Kaweah, we find the same species not rising above 3,500 feet, and not up to its normal elevation in this region. The direction of the valley of the North Kaweah and its slopes are not so favorable to the ascent of the warm air or to the reflection of the heat. The gray buckthorn is peculiarly characteristic of the warm foot-hills all over the interior of California.

Conceiving that a general familiarity with the trees and shrubs of some of these zones and their relation to mountain topography would serve as a diversion during otherwise monotonous hours, I have prepared below a statement of the most obvious arrangement of the belts of ligneous vegetation of the Southern Sierra, with particular illustrations of the chaparral and foot-hills, an area which is otherwise devoid of interest and wearisome during the summer. An account of the trees and shrubs of the forest glades and subalpine solitudes of these mountains will be printed elsewhere. During five seasons past, I have traversed nearly all the trails and roads south of the King's River Cañon and the head of the Kern, and it has been customary to make free use while on horseback of note-book and aneroid in recording the upper and lower limits of various species. As an illustration of the topic of this paper, the route from Sanger to Millwood and King's River has been selected largely because it is the most frequented by the club members. The Colony Mill road (North Kaweah) is richer in species, and the Mineral King road (East Kaweah River) shows the broadest areas of the foot-hill vegetation.

We will indicate four Zonal Areas for the Southern Sierra as best according with observations every one can make as he traverses them. We will give the approximate breadth of these in the King's River region in feet; certain woody plants which are not only abundant and characteristic, but which occur throughout nearly the whole of any

area, yet are limited to, and practically define, the same; also certain subdivisions of the Zonal Areas which may be apparent to the traveler.

ZONAL AREA.	BREADTH IN MILLWOOD REGION.	ZONE PLANTS, OR REPRESENTATIVE SPECIES.
	Feet.	
I. The Plain	25 - 1,000	{ <i>Salix nigra</i> , BLACK WILLOW.
II. The Foot-hills	500 - 4,500	{ <i>Quercus Wislizeni</i> , FOOT-HILL LIVE-OAK. { <i>Ceanothus cuneatus</i> , GRAY BUCKTHORN.
(a) Open Foot-hills	500 - 2,500	{ <i>Quercus Douglasii</i> , BLUE OAK. { <i>Cercis occidentalis</i> , RED-BUD.
(b) Chaparral	2,500 - 4,500	{ <i>Fremontia Californica</i> , <i>Cercocarpus parvifolius</i> , MOUNTAIN MAHOGANY.
III. The Forest	4,500 - 8,500	{ <i>Pinus ponderosa</i> , YELLOW PINE. { <i>Pinus Lambertiana</i> , SUGAR PINE. { <i>Abies concolor</i> , BLACK FIR.
(a) The lower fringe	4,000 - 6,000	{ <i>Quercus Californica</i> , BLACK OAK. { <i>Ceanothus integerrimus</i> , SNOW-BRUSH.
(b) The main body	5,500 - 8,500	{ <i>Sequoia gigantea</i> , BIG TREE.
IV. The Subalpine Woods	8,500 - 11,500	{ <i>Pinus contorta Murrayana</i> , TAMARACK-PINE.

The Plain flora encroaches on the Foot-hills along the river valleys; the Chaparral belt varies greatly in width according to conditions; and the Forest area in its lower "fringe" invades the Chaparral. Therefore the "zone plants" are apt to fall short of the actual limits of the zone to which they belong. But they are selected because they range nearly through their zone, and because they are

conspicuous and peculiar elements of it. Those of the subdivisions are selected because they are eminently characteristic.

The Subalpine Woods seems at first but a thinner upper fringe to the Forest, of which organically it is a part; but there is no species of tree covering the two areas, or much extending from one into the other. This is the exclusive home of the magnificent silver fir, the mountain white pine, the foxtail and white-stemmed pines, in addition to the zone-marking tamarack-pine. Similar to the Forest Zone, it has its main body and upper or "timber-line" margin; and its pronounced demarcation deserves further investigation along the lines of temperature.*

In the discussion following, authors' names are omitted from the species, common names are given wherever possible, and a few of the inconspicuous shrubs are omitted, all for the sake of making the desirable plants to know, more conspicuous.

THE PLAIN.

This area may be supposed to cover that portion of the road between Sanger and Holliday's, the first relay station, but its characteristic trees are chiefly exhibited at the five crossings of the King's River channels. The following trees are conspicuous:—

Salix nigra, BLACK WILLOW.

Platanus racemosa, PLANE-TREE, ranging up to 1,700 feet.

Quercus lobata, VALLEY OAK, ranging up to 3,500 feet.

Fraxinus Oregana, OREGON ASH, ranging up to 2,400 feet.

Populus Fremonti, COTTONWOOD, ranging up to 1,700 feet.

Vitis Californica, WILD GRAPE, ranging up to 1,800 feet.

Alnus rhombifolia, COMMON ALDER, ranging into the Forest.

The extension of these into the mountains, is almost wholly along the streams. *Salix nigra* is known from

* The four zones enumerated probably correspond in a general way to the faunal zones of recent zoologists, named respectively Lower Sonoran, Upper Sonoran, Transition, and Boreal, but sufficient correlating data are at present wanting.

other willows by its long, slender grass-green leaves and furrowed bark.

THE FOOT-HILLS.

So far as the Millwood road is concerned, this area begins a little below Holliday's, or sixteen miles from Sanger, and continues over twenty miles, or well up the long grade between Sierra Spring ranch and McKenzie's mill. Twelve miles of this distance is through the open growth of Zone II *a*, and about eight through the more or less dense chaparral of II *b*.

Near Holliday's, you will see the following small trees distinctly characteristic of Zone II, all of them passing well into the Chaparral belt:—

1. *Quercus Wislizeni*, FOOT-HILL LIVE-OAK, 500-4,000 feet; resembling the Coast Range Live-Oak (*Quercus agrifolia*), but its foliage less abundant, leaves oblong, not oval or roundish, flat, not convex, brighter green and less veiny.
2. *Ceanothus cuneatus*, GRAY BUCKTHORN, 1,000-3,500 feet; appearing on the hill to left of Holliday's, a shrub with clustered, spreading stems and dull-green, thickish leaves about the size of box-leaves. (See figure 1.*)
3. *Æsculus Californica*, BUCKEYE, 500-3,000 feet; its gray or whitish clustered stems, spreading in a fan-shaped manner are well known to every one. In June, its long spikes of white fragrant flowers are showy; in August, it is conspicuous because its persistent foliage has turned a russet-brown.

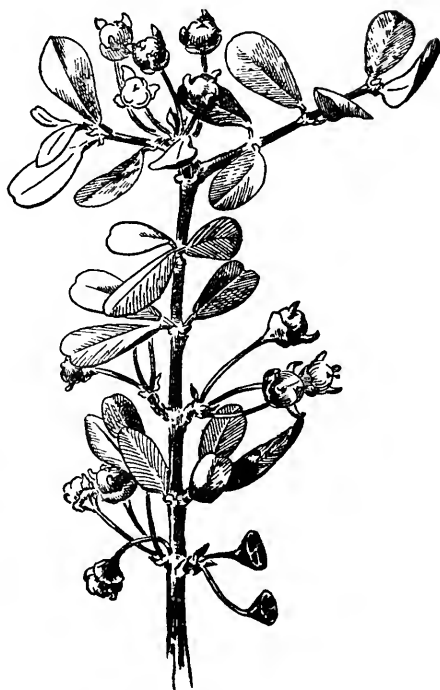


Fig. 1. *CEANOTHUS CUNEATUS*.
Mature fruit; two lower fruits are fallen.

* The drawings are two-thirds the natural size of the plants. They are by Mr. W. S. ATKINSON.

In these first foot-hills also appears the typical plant of the lower open foot-hills, viz: *Quercus Douglasii*, BLUE OAK, 500–2,500 feet. It will be seen that its range practically coincides with that of belt *a* of Zone II. In ascending from Holliday's to Squaw Valley store the road winds among these singular oaks. Their effect in summer-time is one of severe loneliness, almost of desolation, but their individuality is fine. Few shrubs or none accompany them. Scattered over the rolling ground, their dwarf size, gray, finely divided bark, sparse steel-blue foliage that scarcely casts a shade, contrast strangely with the great silent, yellow hills, dim with the pulsating heat.

In this vicinity also appear the following:—

Rhamnus Californica, PIGEON-BERRY, ranging to 6,000 feet.

Rhus diversiloba, POISON-OAK, ranging to 3,500 feet.

Senecio Douglasii, ranging to 2,500 feet.

Lupinus Chamissonis, CHAMISSE'S LUPINE, ranging to 1,700 feet.

Near the head of the steeper part of the grade, *Ceanothus cuneatus* appears at the roadside.

At about 1,600 feet appears a shrub of singularly narrow zone. It is *Ribes velutinum*, a gooseberry with low, stout, much-recurved branches, and very small leaves. It is seen opposite the store at Squaw Valley and disappears at the first creek on the road beyond the store. Its zonal range is only about 200 or 300 feet. It is the same on the Camp Badger road and on the North Tule. Its zone is a slender, sinuous line, a veritable ripple-mark on the great Sierran shore. Descending slightly from Squaw Valley through a natural park of blue oak and gray buckthorn, the road runs parallel to Mill Creek, a typical foot-hill *arroyo* for six miles, or until it climbs out of the blue oaks into the chapparal, covering a range of from 1,600 to 2,500 feet. The presence of several trees of the Plain will be noticed along Mill Creek, particularly near Irwin's fruit-ranch,—the cottonwood, the plane-tree, the valley oak, the

wild grape, all near their upper limit. Near the first small branches of Mill Creek are several plants quite characteristic of the foot-hills, but which rarely extend to either border of this zone. They are the following:—

Calycanthus occidentalis, SWEET-SCENTED SHRUB, 1,700–4,500 feet; a shrub from 5 to 8 feet tall, with abundant foliage, light green in summer; leaves 3–5 inches long; opposite, oblong, entire and roughish. Flowers maroon-colored, $1\frac{1}{2}$ inches across, with numerous linear petals, and a fruit-like fragrance. Something of this odor also in the bruised leaves; seen along small watercourses.

Arctostaphylos viscida, MANZANITA, 1,700–3,000 feet; one of the taller, almost tree-like manzanitas, 8–12 feet tall, sometimes 12–18 inches in diameter at base, plants growing singly and scattered, the only manzanita of the lower foot-hills. The leaves are very rigid, and pale gray-green, twigs smooth; pedicels glandular, hairy; berries adhesive-glandular, acidulous, and palatable to the bears. (See figure 2.)

Cephalanthus occidentalis, BUTTON BUSH, 1,700 feet; shrub, with light green foliage, leaves opposite or in whorls of three or four, 3–5 inches long, lanceolate; small whitish flowers in globular heads one inch in diameter, on slender pedicels.



Fig. 2. *ARCTOSTAPHYLOS VISCIDA*.
a, flowers; b, fruit.

Cercis occidentalis, REDBUD, 1,700-3,500 feet. The beautiful pink-purple, pea-shaped flowers are gone in summer and succeeded by flat pods, 2-3 inches long. The round, cordiform, smooth leaf, similar to the cultivated red-bud of Europe will distinguish this small tree.

Eriodictyon glutinosum, YERBA SANTA, 1,700-4,500 feet, usually growing on banks of clay or broken rock; shrub 3-5 feet high, with alternate, lanceolate, thickish leaves which are veiny and resinous, and often covered with the black, sooty mold of orange and olive trees. The flowers are lavender-purple, tubular trumpet-form, and $\frac{1}{2}$ - $\frac{3}{4}$ inch long.

Above Dunlap — a post-office, stage station, and tavern — the blue oaks begin to disappear and the road to enter chaparral. This is at the beginning of the "Granite Grade,"

a hot and dusty section of the road, with little shade. Mill Creek and its branches now lie in a deep valley to your right. In this region, and along the watercourses of Mill Creek from this elevation upward you see the California bay, or laurel, the well-known tree of the Coast Ranges, which here ranges between 2,000 and 4,500 feet.



Fig. 3. FREMONTIA CALIFORNICA.
a, bud; b, flower; c, fruit.

Near the lower border of the chaparral, or "brush," appear several new and characteristic species, as follows:—

Fremontia Californica, FREMONTIA, 2,500–4,000 feet; the "slippery ellum" of the foot-hill residents. It is no elm, but its inner bark is mucilaginous like that of the Eastern slippery elm, and therefore suggested the latter species to the early settlers. Its leaves with rusty wool beneath, its beautiful yellow flowers, in appearance suggesting a hollyhock, and its fruit capsule with hispid stinging hairs easily identify the plant. (See figure 3.) Its order is tropical, and this is the only member of it in the United States. It is quite as valuable a "zone plant" for the Chaparral belt, as the blue oak is for belt *a*, usually extending from the lower border of the chaparral nearly to the border of the coniferous forest.

Fraxinus dipetala, FLOWERING ASH, 2,500–3,500 feet. It is a small tree, and will be recognized as an ash by its opposite, pinnate leaves and clusters of winged seeds. When in flower it is nearly as ornamental as the manna ash of Europe.

Ceanothus divaricatus, WHITE BUCKTHORN, 2,700–4,000 feet. This is a chaparral shrub, usually in thickets and conspicuous from its white bark. Its fruit is similar to that of the gray buckthorn, but smaller and more resinous.

Bigelovia arborescens, CHEMISAL, 2,500–4,000 feet. A composite shrub with flowers resembling a golden-rod, appearing late in the summer. It is not abundant, but its wand-like branches covered with a brush of slender, bright green leaves, contrast strongly with the other spinescent, xerophytic shrubs.

The road turns at "Elephant Rock,"—elevation about 2,800 feet,—and beyond this point the chaparral is densest and most characteristic. Beside the four species just mentioned, are the red-bud, the foot-hill manzanita, the bay-laurel, the Yerba Santa, the gray buckthorn, and, most abundant of all, the foot-hill live-oak.

Not far beyond this slope of brush the road turns through a pretty notch in the rocks, with a brook tumbling through it. Here is the first fringe of the forest; here the cool upper woods extend at least a finger-tip to encourage the climber. A single sugar-pine stands on a knoll across the brook, and a little above a yellow pine,—the first pines

on the road. The common alder, abundant on the streams of the plain and those of the mountain forest, also reappears here, together with the valley oak. A mile or more beyond

this spot, beyond two or three small ranches, and near Noble Post Office, we come upon the first black oak; and still farther

on, in approaching Sierra Spring, we find surer evidences that the still abundant chaparral is giving way before the descending forest mantle.

Here the beautiful *Libocedrus*, or California cedar,

the bear-mat, the mountain live-oak (*Quercus chrysolepis*), and considerable numbers of the yellow pine are found. At Sierra Spring the elevation is not too great, however, for the cultivation of grapes from the Eastern States, of corn, the locust-tree, and the umbrella-tree.

Beyond the steep grade above Sierra

Spring, the chaparral makes another stand, and produces at least six new and characteristic species :—

Cercocarpus parvifolius, MOUNTAIN MAHOGANY, 3,800-4,000 feet; a shrub usually appearing lower down; easily recognized by its long, plumose, clematis-like tails to the fruit. (See figure 4.)

Quercus Breweri, BREWER'S OAK, 3,500-5,500 feet. This appears somewhat below Sierra Spring, but southward across the cañon. It prefers northward or northwestward slopes, extends in this region into the forest belt, and seems like a species belonging to the forest border, but, as observed elsewhere in the Sierra, it is a chaparral plant. It is a shrub, or sometimes a small tree, with flat scaly bark, and has abundant acorns. (See figure 5.)

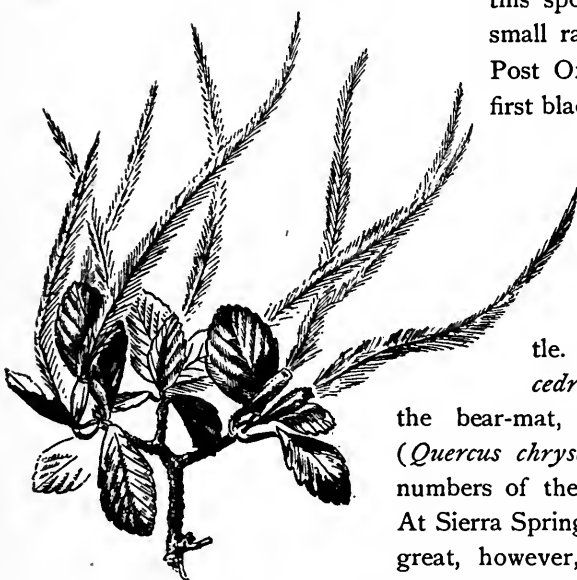


Fig. 4. *CERCOCARPUS PARVIFOLIUS*.
Mature fruit.

Quercus dumosa, SCRUB OAK, 4,000-4,300 feet. Like Brewer's Oak, it is of the "White Oak" type, and is inclined to grow in thickets. It is low, with stiff intricate branches, small leaves and acorns.

Dendromecon rigida, BUSH POPPY, 3,800 feet. This shrub, a true poppy, with large yellow four-petaled flowers, the color of the evening primrose, or paler, and willow-like glaucous leaves, is inclined to appear in a very narrow belt, usually only one or two localities along any trail.

Arctostaphylos Mariposa, MANZANITA, 3,500-5,000 feet. This is a shrub 2-4 feet high, of clustered stems, and gray, almost blue, leaves, with very glandular-hairy branchlets and pedicels, and glandular berries. This is very different in habit from the foot-hill manzanita. It has not the fruit or pedicels of *A. platyphylla*, which it resembles in leaf and relation to altitude, but comes near to *A. Pringlei* of Southern California. Wherever I have collected it, from the Tule River to Calaveras County, it maintains this relatively high altitude in the chaparral.

Prunus subcordata, WILD PLUM, 4,300-4,500 feet. A low shrub with stout, very stiff spinescent branches, and the foliage and fruit of the true plum, although smaller. This is also a shrub preferring western, rather rich slopes, and its range in altitude is limited to a few hundred feet, wherever observed in the Southern Sierra.

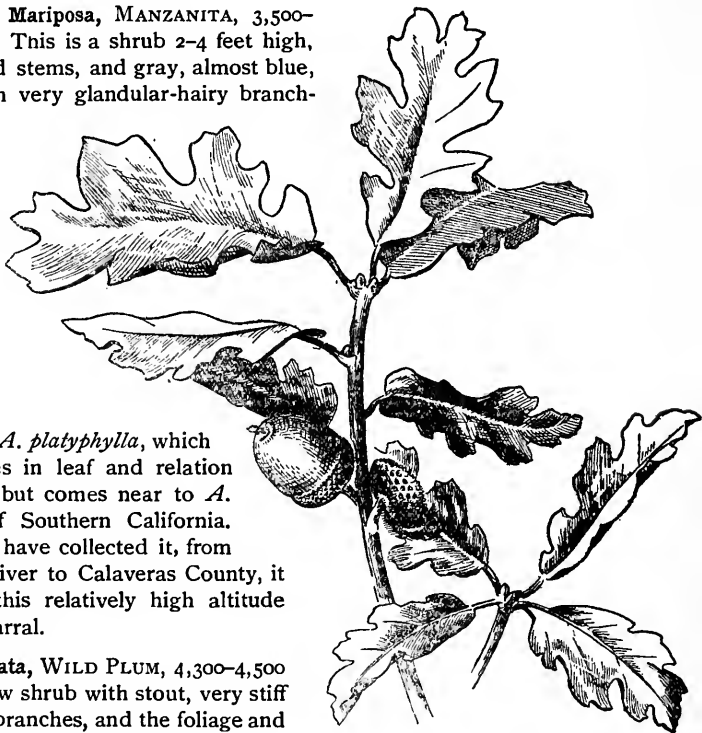


Fig. 5. *QUERCUS BREWERI*.
Mature fruit.

In this last stretch of the chaparral, in which the road rises nearly a thousand feet, we still find the type plant of

this zone, the foot-hill live-oak (*Q. Wislizeni*), *Fremontia*, and the white buckthorn, the Yerba Santa, and the sweet-scented shrub; but they all cease before the road enters the coniferous woods. The laurel, its leaf often wider and more glaucous, still continues. But the red-bud, the gray buckthorn, the buckeye, the two species of ash, the poison-oak, and the foot-hill manzanita

ceased before we reached Sierra Spring or before we passed the grade above it.

If you pass over this road in October, and look down from this grade over the slope toward Noble, you can trace the upper limit of the red-bud by the crimson color of its autumnal foliage. Around you

the fringing woods will be yellow from the black oak and Brewer's oak, and perhaps from some ravine higher up in the pines you may catch the scarlet of the flowering dogwood, that causes the ravines beyond Millwood and near the

General Grant National Park to glow with an Appalachian splendor.

For some time we have been traversing the fringe of the forest as it overlaps the chaparral. We observe its oak, its occasional pines in the ravines, and near the line of the Forest

Reservation we pass the first "snow-brush" (*Ceanothus integerrimus*, see fig. 6), with its snow-white plumes of fine white blossoms — white plumes of the true forest, and a sure

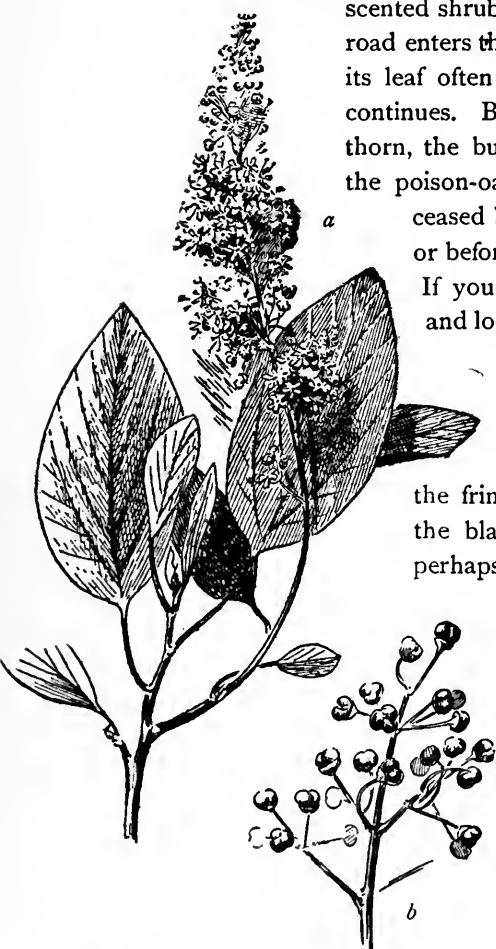


Fig. 6. *CEANOTHUS INTEGERRIMUS*.
a, flowers; b, fruit.

sign that the climbing, pushing chaparral is defeated and soon to disappear. You are sure of finding brooks or springs not far away, while you still have the genial, mellow warmth, by which the ascending valley currents temper at night the cool, clear, pure air of the high forest. No place in all the mountains has the charm of the lower margin of the great forest. The pine and cedar woods are open and full of light, the brush is gone, and in its place is a carpet of golden green, spread everywhere over hill, through narrow glade, evenly unrolled and deftly laid close to every rock and brown tree-trunk. It is the bear-mat, or bear-clover (*Chamæbatia foliolosa*), a low rosewort shrub with a white blossom resembling a strawberry, a leaf like a delicately-cut fern, and balsamic fragrance that suggests all the healing resins of the great mountains and plains. The brilliant green of the young cedars, the pale blue of the scattered *Arctostaphylos*, blend well with its color, and the spreading old black oaks, here and there, play with the sunshine and the shade on the hill-slopes that seem to belong to it. Along the mountain-side, to the right of your road, and nearly parallel to it, the line of the lofty coniferous forest has been passing like the files of an army, so abrupt is the change from the brush and the low deciduous trees. The road turns a little, and you enter it among the pines and cedars, sure of a balmy, cloudless, and silent night,—a typical summer night in the forest border of the Southern Sierra.

In reviewing the foregoing notes, there are some species conspicuous by their absence. One misses the gray pine common in the California foot-hills (*Pinus Sabiniana*), and the chamiso, a spiræa-like rosewort, with foliage of a heath. Although they do not appear along the road, one is quite likely to find in the cooler ravines of Mill Creek, the big-leaf maple, the bladder-nut, its roundish inflated pods an inch or two long, the wild syringa, as showy as its cultivated

relatives, and *Torreya*, a tree with bark like a cypress, leaves like a fir, but dark and prickly-pointed, and fruit like a small plum. It is related to the yew-tree. All of these I have found on the Kaweah River forks, and some on the Tule River. Indeed, two of them I have found toward the sources of Mill Creek itself.

Another thing worthy of remark is the fact that the good zone plants are found in genera prolific in California species, or else in those having only one species on the Pacific Coast. In every zone and belt above the Plain we may find one or more species of *Ceanothus* and *Arctostaphylos* (manzanita). In each zone and belt except the Subalpine, we find one or more species of oak. On the other hand, *Fremontia*, the red-bud, the sweet-scented shrub, the button-bush, the wild plum, the bear-mat, the bladder-nut, *Torreya*, the buckeye, the wild grape, the plane-tree, and the laurel are in each case the only species of the genus on this coast. Other genera might be mentioned which contain but two species. Our climate is apparently remarkable for its subtle but marked local variations. Generic types, inclined to great variation, like the oak type, find conditions adapted to their variety of tendencies, and time has fixed these variations as "species," so-called, adapted to different elevations. Generic types of a single or very few and widely separated species are evidently not adaptive; and were it not for a great variety of climatic conditions such as prevail here, many of these types would have presumably disappeared from the earth long ago, from lack of the fine balance needed in their environment.

MT. WASHINGTON IN WINTER.

BY GORHAM DANA.

To those who do their mountaineering in the High Sierra the White Mountains of New Hampshire must appear tame and insignificant. But the altitude of these mountains is by no means a measure of their importance. Covering an area only about twenty-five miles square, they probably give pleasure to more people than do any other mountains of equal area in the country. The reason for this lies in the fact that they are located in one of the most populous sections of the United States and are very accessible from all sides. Innumerable villages and isolated hotels are found throughout the region, and these are connected by well-built roads and railroads. In the summer these hotels are crowded with fashionable guests, many of whom, I fear, are attracted more by the swell hops and excellent golf-links than by the magnificent mountains. Yet, in spite of all this, it is a wild region, and many parts are as primeval and unstained by civilization as is anything to be found in California.

Mt. Washington, the king of the group, rears his bald and wind-swept summit to a height of 6,200 feet, while, on either side, his neighbors in the Presidential Range reach altitudes of from 5,000 to 6,000 feet. To the west, and separated by the wonderful Crawford Notch, is the Franconia Range, whose highest peak, Mt. Lafayette, is 5,200 feet high. To the south numerous lesser ranges and peak cover the remaining area.

The Appalachian Mountain Club, an organization quite similar to the Sierra Club, does much of its mountaineering in the White Mountains. The Councilor of Improvements keeps in repair many of the old paths, besides occasionally cutting new ones. The Councilor of Topography has done a great deal to correct and complete the maps of the region. Many of the meetings and outings of the club are held here, sometimes at hotels and sometimes in camp.

One of the most unique outings is the annual trip of the snow-shoe section. This usually takes place late in February, when the snow is deep and well compacted, and it lasts about ten days. The party increases in size from year to year, and last winter consisted of nearly eighty persons, about one third of whom were ladies. From the headquarters at Jackson many peaks were ascended, and the outing culminated in a trip to Tuckerman's Ravine and Mt. Washington, of which I will attempt a short description.

Wednesday, February 21st, was a perfect winter's morning—clear, a high barometer, and a temperature of 3° above zero. At 8 o'clock a party of eleven men bound for Mt. Washington started in the first sleigh, soon followed by a larger mixed party bound for Hermit Lake in Tuckerman's Ravine. It was a ten-mile drive to the ravine path, over a road heavy with fresh snow. Here three of us disembarked and started for the summit of Washington by way of the ravine. The other eight continued on a little farther to the carriage-road, by which they planned to make the ascent. We all planned to meet on the summit at about 4 P.M., and then, descending the carriage-road, to reach Darbyfield Cottage in time for supper. In case we were delayed, the others were not to hold the sleigh for us after 8 o'clock. Our party of three, therefore, started off at 10 o'clock, with snow-shoes, creepers, ice-axes, rope, and enough lunch for one meal.

The regular trail to Hermit Lake was hard to follow, as

loggers had been cutting side-paths since any of our party had been there. We lost the path, and consumed much time and energy in "slabbing" along the side of a steep hill when we should have been on comparatively level ground across the valley. The snow was three or four feet deep, and we used wide Indian snow-shoes, which are very tiresome on steep side-hill work. As a result, the main party overtook us, and we proceeded together as far as Hermit Lake, where we all lunched. It was 2 P.M. when we left the icy lake and started to climb the snowy head-wall of the ravine.

It is an impressive sight to stand in this great semi-caldron and look up the steep and rugged slopes to Lion's Head, on the north, and Boott Spur, on the south. These two slopes are practically impassable, but between them is a somewhat less precipitous slope, known as "the head-wall." This wall, a tangle of brush and fern in the summer, was filled in with an immense quantity of snow, twenty to one hundred feet deep, so that all signs of *terra firma* were hidden, and nothing was seen but an immense snow-bank 1,000 feet high, and so steep that its ascent looked impossible at first glance.

A few of the main party followed us a short distance up "the head-wall" in order to have the sport of coasting down. The snow was wind-packed and very hard, though not crusty. We took off our snow-shoes and strapped them on our backs. At first we got along very easily by picking foot-holes in the snow with our toes; but later the snow was so hard that we had to use a pole to bore out each foot-hole. We proceeded slowly in Indian file, the front man doing all the work of making foot-holes, and being relieved frequently by the man behind. We saw the main party disappearing down the valley on their homeward trip. We shouted a last good-by, then all was still. Up, up we went. A misstep now was dangerous. The slope was so

steep that by standing erect one could touch the snow by extending the arm horizontally. Fortunately there was no wind, and the temperature was not low. Otherwise, this would have been cold work — moving so slowly.

By four o'clock we had risen some 900 feet, and had passed the steepest slope. But the most dangerous part was still ahead, for here the snow became crusty, and occasional jagged rocks stuck up through it, so that a fall was not pleasant to contemplate. We had to cut each footstep here with an ax, and this was even slower than pole work. But the view was magnificent, and we stopped every now and again to admire it.

The slope now became less steep, and we could cling on to rocks and bushes that broke through the crust, and thus make much faster time. And it was well we could, for the sun was already low, and light clouds were blowing up from the south. By half-past four we were well out of the ravine and on the steep, wind-packed slope of the cone. Here we could make comparatively fast time, and were held back only by the capacity of our lungs. Up, and ever up. It seemed as if there were no summit. Clouds were gathering and the darkness shutting in. Finally we discerned the outlines of a building. It was one of the barns connected with the summer hotel on the summit. After a short climb up the icy carriage-road, we reached the summit. There was no human being in sight. We broke into the carriage office and found the dying embers of a fire in the stove. The other party must have come and gone.

It was now about 5:30 and beginning to get dark. Clouds had been blowing up for some time, and now hung over the summit so as to obscure all view. Should we descend in the darkness or camp out in the carriage office? Only one of us had ever been down the carriage-road, but as a storm seemed to be brewing we decided to descend.

We made a hurried lunch off a couple of sandwiches and some chocolate and started down at 5:45.

The carriage-road was glare ice. Had we realized this sooner, we should have stayed on the summit over night. It was in such a condition that, as we afterwards learned, two of the eight who tried to go over it in daylight turned back, and two others preferred to descend another way; while we, ignorant of the danger, were descending it in darkness. Fortunately the road was well defined, being cut into the mountain-side, and having a stone wall on the lower side, so that there was little chance of losing the way.

Near the summit the road was covered with a thick, hard ice. Farther down the snow was deeper, and lay in great drifts across the road. It was covered with a thick crust almost as hard as the ice above. With good creepers the walking was not difficult, though slow, except at the drifts. Here, on account of the steep slope, it was necessary to cut foot-holes. Had it been light enough, we could have found the holes made by the earlier party, but as it was we had to cut a new set of our own.

Before we had gone far one fellow cut a great gash in his wrist. His ax glanced in cutting a hole in the crust and gave him a wound that crippled him for the rest of the trip. We bound up the cut with a long bandage we had, and then tied ourselves together, putting the cripple in the middle. In this way we descended, step by step, slowly and cautiously. One big drift, perhaps 500 feet wide, seemed interminable. It took us about one hour to cross it. We had now gotten below the cloud on the summit and emerged into a mild starlight evening. From here on we were able to make a little better time, for the drifts were fewer, and in many cases we could find the foot-holes of the morning party. But it was slow work at best.

It was 11 P.M. when we finally came in sight of the half-way house. It had taken us five hours to travel four miles — down hill at that.

Our reception was not a warm one. The back door was open and the kitchen full of snow. Fortunately there was a well-stocked wood-pile in the yard, and we were soon sitting around a roaring fire. After some hot chocolate and a part of a sandwich apiece, we turned in for a few hours' sleep. We had no blankets, but by keeping near the fire we were fairly comfortable.

We were up again at six, and got together a little more of the previous day's lunch. Then we started off to complete our trip by daylight. It was snowing hard, but still mild. The snow covered the slippery crust, and made the walking treacherous. Fortunately there was but little more crust-walking, as we were close to the tree-line. In fact, a short distance below we found the road had been broken out by loggers, and the walking was good. It was nine o'clock when we got to Darbyfield Cottage at the base of the mountain. Here we got a good breakfast, and later returned to Jackson, where anxious friends were awaiting us. Here we found that six of the other party had reached the summit, but had found the trip so difficult that they supposed that we would not be able to reach the top, and so did not wait for us.

ROUND ABOUT MT. DANA.

BY J. S. HUTCHINSON, JR.

Tuolumne Meadows, to the camper, is a center of many attractions. Probably no place in the mountains of California is better situated for the base of operations, for a great number and a great variety of short trips, than is this beautiful meadow. The Tuolumne Cañon, Mt. Conness, Mt. Dana, Bloody Cañon, Mt. Lyell, Cathedral Peak, and a number of domes are all within easy reach from here.

Last July, in company with M. R. Dempster, J. K. Moffitt, M. A. Aldrich, and Lincoln Hutchinson, I spent several days in the Meadows and made a number of side-trips therefrom. As we descended the Tioga Road into the Meadows from the west, a beautiful prospect was spread before us. In the background at the end of the broad, green meadow, with its beautiful clear river, rise the reddish-brown slopes of Mt. Dana and the grayish slopes of Mt. Gibbs, both appearing near enough for an after-dinner stroll. At the very first sight of these peaks, we felt a desire for a closer acquaintance with them.

After several days in and about the Meadows, one day, at mid-afternoon, we started from Lambert's Dome, to visit Mt. Dana, and to see what we could see toward the end of the Tioga Road—"The Great Sierra wagon road." Several times we had kept company with this road in its ups and downs, turnings and twistings, from Crocker's to the Meadows, and had often wished to see the location of the old Tioga Mine, which had led

men, eighteen years ago, to expend \$62,000 in building this substantial road through a rough and rugged country. For a mile or two after our start we kept on the level; then the road was forced by the stream to take to the side of the mountain, and it soon became exceedingly narrow, but not in the least dangerous. In places it was rough, but still no great care was needed in driving our spring wagon over it. About a mile up the grade we met a small band of Indians on horses,—about eight in all,—bucks, squaws, and papooses,—probably crossing the mountains from the Mono Plain. They seemed surprised at the sight of us with our wagon. Attempts to carry on a conversation with them were almost futile, for their English vocabulary was exceedingly small, and our Indian vocabulary still smaller. We coveted a woven water-basket carried by one of the squaws, but learned through negotiations carried on by signs and symbols that she had placed a basket-trust price upon it, greater than the traffic would bear. One other thing which was learned from them in passing was that possibly something beyond, farther up the road, would not altogether please us. Just as we passed, one of them, a robust, fine-looking buck, pointed in the direction in which we were going, and said, "Heap no good." This being interpreted in the mountains might mean many things,—that there was no water, that there were fallen trees across the road, or that the road had been washed away. Fallen trees and washed-out roads had bothered us many times since we had left Crocker's, but in no case had done more damage to us than to shorten our day's journey by five or ten miles. The road here was too narrow and too precipitous for us to turn about, even had we been so inclined. We parted from the dusky-red people and went on. In half a mile we knew what, in the Indian dialect, "Heap no good" meant. The road, which on none of the mountain slopes was any too wide, for half

its width had been washed away for thirty yards or more, and carried down the precipitous slope, into the foaming and roaring waters of Dana Creek, and a small landslide from the steeps above had covered what was left of the road. We tumbled the bowlders from the débris into the stream, built up the outer edge of the road as much as possible, and scooped a groove near the inside bank, so that the inner wheels of the wagon would cling some. The horses were then taken out and led about forty yards to a safe place beyond the slide. Heavy ropes were attached to the trees on the slopes above, and also to the bed of the wagon, to steady it and to keep it from upsetting on the very sideling places. After these preparations, which had delayed us considerably over an hour, by pulling on the wagon-tongue and turning and twisting on the wheels, the wagon was slowly and safely moved across the dangerous place. We hitched up the horses and proceeded, only to find a short distance farther on, a tamarack had fallen squarely across the road. This had to be chopped through.

The road was exceedingly interesting to us, not only because of its own beauty, but because as we reached the higher elevations, the mountains to the south, near Lyell, gradually unfolded to view, and we could see the course taken by us two days before in our ascent of Lyell. We also, with the higher altitudes, got delightful views back on the Meadows below.

Camping-time found us at a point on the western slope of Mt. Dana, near where the Bloody Cañon trail turns off from the Tioga Road. Here we pitched camp near a tiny brook, picketed our horses, and prepared dinner. All were very tired and quiet. The usual rejuvenation, however, occurred during meal-time, and we suddenly became aware of what a charming camping-ground it was. The ruddy sunset glow was reflected in the Tuolumne, as it meandered through the Meadows, and the numerous

domes and pinnacles about the Meadows were silhouetted against the western sky. The snow-patches on the gray sides of Mt. Gibbs seemed very near at hand, and took on a glorious luster in the slanting sun's rays.

Having been on the go constantly for several days, it was decided to take it easy the next day. The trip to the old Tioga Mine, not more than four miles from our camp, over a fairly good road, would be an easy one. The next morning, rather late, we set out on foot. The walk was easy and delightful, and in about two miles we crossed Tioga Pass, at an elevation of 9,941 feet. To the right of the road were many small lakes and ponds, and going down grade on the eastern slope we soon passed near Lake Jessie. It is said that in this lake there is exceedingly good fishing.

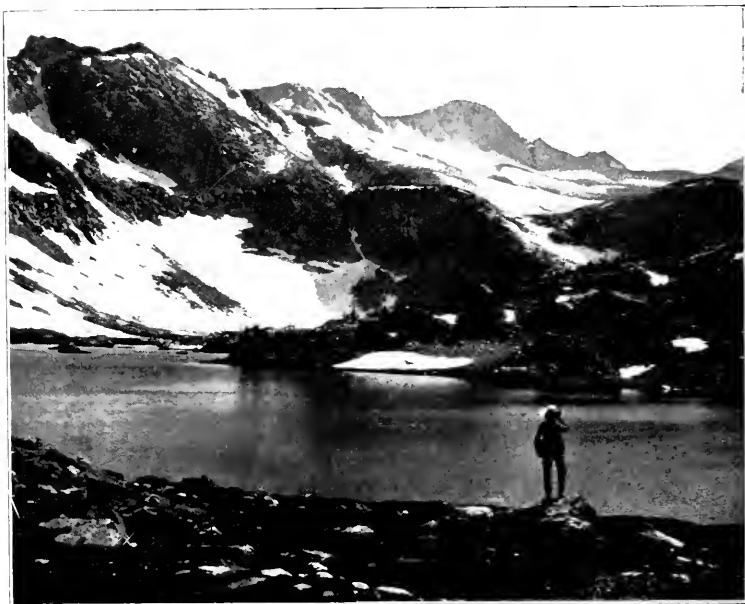
The interesting old Tioga Mine is nestled down in the bottom of a bowl formed by the mountains. From the northwest a noisy stream comes rushing past, and a roaring cascade comes down from the melting snows on a neighboring peak to the west. The buildings of the mining settlement consist of an assay office, blacksmith-shop, storehouse, boarding-houses, workshops, and cabins of various sorts, all in a fairly good state of preservation considering the length of time they have been neglected. The foundations of many are somewhat askew, and the roofs of others are crushed in by the winter snows. The whole settlement has the appearance of having been deserted without a moment's notice, as though the population, fearful of some great cataclysm, had suddenly fled, as from a burning Vesuvius. The only inhabitants were a number of mountain rats and inquisitive chipmunks, which were making the most of the old letters, books, and tin-can labels about the buildings.

After prospecting the buildings and satisfying our curiosity, the morning was still quite young. The mine had been the goal of our day's trip, but it was early, and the



MT. DANA FROM THE NORTH—SADDLEBAG LAKE.

† Mt. Conness.



MT. CONNESS, LOOKING SOUTHWEST, SHOWING GLACIER AND CREVASSE.
(Photograph by M. R. Dempster.)



country to the north looked interesting. The map showed the name "Saddlebag Lake" not far beyond, and it was decided to explore farther, and, if possible, to eat our mid-day meal on the shores of this lake.

This whole trip illustrates one of the attractions of the mountains, especially of a new region. Each step unfolded to us new views, in kaleidoscopic fashion, in the greatest variety, and the excitement of suddenly coming upon something novel in the way of scenery, constantly kept us on the alert and led us on and on.

Following up the cañon, which leads down to Tioga from the northwest, we presently crossed to the northeastward over a low-lying ridge. Series after series of alpine views came upon us. The Alps-like Sierra was to the west. The bare slate and granite formation, so characteristic of the eastern slope, lay to our right. Occasionally stunted hemlocks with their delicate and beautiful foliage were passed. Every now and then were seen signs of the work of the miners, in the shape of heaps of cordwood, a broken-down saw-mill, and piles of charcoal made from the surrounding tamaracks.

After what seemed quite a long walk,—for our appetites were now very keen,—we passed alongside a very narrow gorge with precipitous walls, through which the outlet stream from Saddlebag dashes, roars, and foams until it reaches a more level place below. A little after noon, somewhat weary, we reached the southern shore of Saddlebag, a beautiful sheet of water hemmed in on all sides, save at its outlet, by rugged mountains, the snowy ridge of the Sierra being to the west and the reddish slate formation to the east.

The eastern slope of the Sierra just here differs from what is found in most places. Usually there is a very abrupt descent from the main crest to the plains to the eastward. Here we found, to the eastward of the main

crest, a ridge—Tioga Crest—formed of reddish slate, running almost parallel with the main crest, and forming a good-sized cañon between the crest and the Mono Lake district to the east.

The northeastern boundary of the National Park, running north and south, divides Saddlebag Lake into two parts. Here on the southern border of the lake, close to the dividing-line, we took our lunch. While here a flock of wild ducks appeared, flying close by, and alighting near the west shore. Visions of a duck dinner appeared before us. The ducks, however, discreetly kept within the park limits, apparently knowing the restrictions against firearms, and believing in Uncle Sam's protective policy. While we patiently awaited the moment that they should cross the dead-line, they disappeared beyond a projecting point and were lost, the park boundaries and the limitations of the law alone preserving them.

After lunch we had a delightful swim in the cold waters of the lake. It is filled with large and noisy frogs that croaked to us singly and in chorus, with occasional intermissions. The little animals, astonished at our intrusion into their native waters, darted away at our approach, presently, however, to return and view their visitors.

Our objective point in the morning had been Tioga. Reaching there, the country northward showed so many attractions that the irresistible temptation came upon us to go farther. Saddlebag Lake then became our destination. Once there, a new and enticing field opened to our view up the lake, and the map again showed many interesting features,—Doré Cliffs and a batch of tiny lakes nestled in at the eastern slope of Mt. Conness. Some one suggested that we ought to explore still farther, and one after another all the members of the party volunteered to go.

On both the eastern and the western side of the lake the mountains slope precipitously, at about forty-five

degrees. The huge boulders, jagged and sharp, lie helter-skelter, topsy-turvy, from the summit to the water's edge. The snow lay deep in patches on the western side down into the water. Up the western side, over the rocks, jumping from one to another, floundering through fast-melting snow-fields, we pushed on and on to the end of the lake. The tiny lakes shown on the map were opened up to our view — each with its reservoir of melting snow, each in its setting of alpine mountains, and back of all the ridge of the Sierra, and, most interesting of all, the eastern slope of Mt. Conness, with its huge amphitheater, so common to the high peaks of the Sierra. Near the summit of Conness appeared clearly and distinctly its glacier and crevasse.

It was getting late; the sun was rapidly sinking and casting long, deep shadows on the mountains, bringing out in bold relief every depression and sag in the ridge, showing the ribs of the mountains, and giving to the peaks a ruddy glow. The slopes of red slate took on a vivid hue.

After only a glimpse of a portion of Doré Cliffs, the lateness of the hour forced us to return hastily and reluctantly toward camp. We took the eastern side of the lake, which proved to be very much easier than the west side, and hurriedly retraced our steps toward camp. The sun had long since set for us in our position on the eastern slope, for we were about 2,000 feet below the crest, but we could see it still gilding Mt. Dana and lighting the various peaks about us. Camp was reached just as the sun was setting on Tuolumne Meadows, flooding it with light, making of the river a thread of molten silver, bringing out Fairview Dome and the peaks to the west against the golden sunset, and painting Mt. Gibbs and the snowy Lyell group with alpine pink. Then came the twilight and the stars.

The next day we loafed about camp until 3 o'clock, spending some of the day in washing and baking. Then

packing our sleeping-bags and provisions for two meals, on our little mule, we started up the slopes of Dana. The trail led us up through the forests. A gray tree-squirrel, aroused from his slumbers on a tamarack limb, by the sudden jangling of our mule-bell as we passed, lost his hold and fell with a thud to the ground. Stunned and dazed for a moment or two, he gazed around, then gathering himself together scampered off and disappeared behind a bowlder, wondering what monsters had thus impolitely broken his afternoon nap.

Passing up out of the growth of tamaracks and pines, nearly to the divide between Gibbs and Dana, we pitched our camp a mile to the west of the divide, among the rough rocks. After supper two of the party strolled to the saddle between Gibbs and Dana, and got a sunset view of Lake Mono, which assumed a beautiful salmon-pink. Our camp was above the timber-line at an elevation of perhaps 11,000 feet. The only growth was what appeared to be a scrubby willow, crushed to the earth by the winter snows, and hugging the ground as though afraid of the blasting winds which sweep up through the Tuolumne Meadows. It would have been better to have camped lower down, near the timber-line, for there we would have had shelter, fuel, and softer beds. The rocks where we were were sharp and uneven, and it was with difficulty that we found spots level enough to stretch ourselves at full length. There was compensation, however, for the discomforts; for the stars twinkled more brightly and the unobstructed view of the snow-patches on the slopes of Mt. Gibbs during the night was a novelty. As we lay half-awake these patches would assume every shape, from maps of vast continents to all the animals of a Noah's Ark.

The next morning, at the first inkling of dawn, when the darkness was so intense one could not tell one's shoe from the coffee-pot, we groped around and got breakfast.

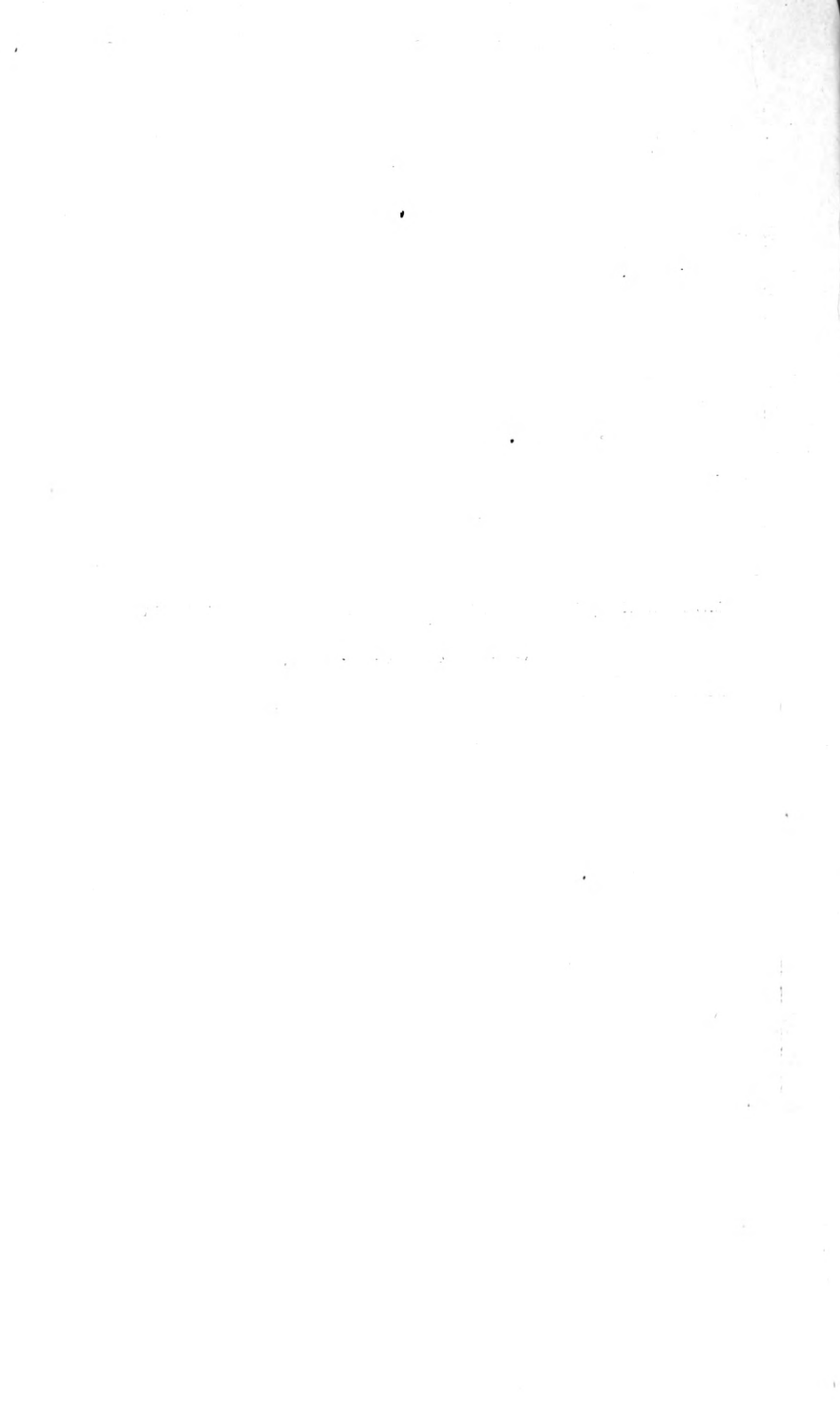


MONO LAKE AT SUNRISE, FROM DIVIDE BETWEEN MT. DANA
AND MT. GIBBS.

Mt. Lyell. † † Mt. McClure.



THE LYELL RANGE, FROM SUMMIT OF MT. DANA. SHOWING LYELL
AND McCLURE GLACIERS.



Dawn came rapidly. Exactly as the sun rose over the hills of Nevada we again stood on the saddle between Dana and Gibbs and photographed Lake Mono far below us. Just below us, in almost perpendicular walls, lay a tiny lake, partly frozen, with a huge snowbank dipping into its western side.

From here we followed the main crest to the summit, an easy and not in the least dangerous climb, so long as we stepped carefully from rock to rock, and did not attempt to cross the snow-fields, which in places were quite rough and hummocky, and elsewhere frozen and glassy. To cross the frozen snow would have been exceedingly dangerous, for a misstep would have landed one on the jagged rocks at the foot of the bank. We did not hurry at any time, but stepped cautiously, selecting our stepping-stones. Inside of two hours we were on the summit, little fatigued and ready to feast our eyes in every direction. Just below us to the east, at the foot of a great precipice, lay Glacier Cañon, sloping down toward Tioga. Just beyond it lay the Dana Plateau, at an elevation of 12,000 feet. This is a very curious formation, and we longed to explore it, and should have done so had time permitted.

Off to the northeast, only eight miles distant, but 7,000 feet below us, lay Lake Mono, shining in the sunlight, with its little islands looking like blots of ink on silver paper. Just to the south of the lake were plainly visible the numerous volcanic cones and craters of the Mono Plain. The mountains of the Lyell Range, eleven miles distant as the arrow flies, snowy and beautiful, with numerous shining little lakes in scooped-out basins, lay to the southwest. Tuolumne Meadows, broad and green, to the west; the Saw-Tooth Ridge, the Matterhorn, Tioga, and Saddlebag Lake to the northwest. From our elevated position we could trace every footstep of our trip of the day before. To the north Mt. Warren occupied a very conspicuous position.

Mt. Dana is splendidly situated to show one the contrast between the east and the west side of the Sierra. The west side is white with snow; the east, dark and red and dry. One side is cool, balmy and inviting; the other hot, dreary and uninviting. The view from Dana cannot equal that from Lyell; in fact, I doubt if many views can equal that. From Lyell, rugged, jagged peaks in endless profusion are seen, and you stand on the brink of a mighty precipice, with little lakes scattered here, there, and everywhere about you in the depths below. From Dana the view is not so wild, but there is very great variety. We remained upon the summit about an hour. The only living things were a few butterflies and small birds flitting hither and thither about the peak. After a delicious feast upon the magnificent views, clear atmosphere, the solitude and the absolute stillness, with incidentally a few raisins, chocolate, and grape nuts, we took a few photographs and started downward. Greater care was required in going down, than in ascending, lest we slip and turn an ankle on the rough rocks, but still progress was very rapid, and in a brief hour we were again in camp, ready to pack and return to the Meadows.

The trips to Saddlebag Lake and Mt. Dana can be recommended because of the beautiful and varied views obtained on each, and also because of the ease with which the trips can be taken. Horses can be ridden all the way to the lake and beyond, and also to within about 2,000 feet of the summit of Dana. We all returned to the Meadows well pleased with the few days which we had spent about the mountain.

SIERRA CLUB BULLETIN.

PUBLISHED IN JANUARY AND MAY OF EACH YEAR.

Published for Members.

Annual Dues, \$3.00.

The purposes of the Club are:—"To explore, enjoy, and render accessible the mountain regions of the Pacific Coast; to publish authentic information concerning them; to enlist the support and co-operation of the people and the Government in preserving the forests and other natural features of the Sierra Nevada Mountains."

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SECRETARY'S REPORT.

FROM MAY 5, 1900, TO MAY 2, 1901.

Never before in the history of the Club has its outlook for the future been more promising. Membership in the Club is becoming very desirable because of the advantages which are now opening to its members. We no longer have to solicit for members, and applications are continually coming in from all sources. These recent acquisitions to our membership are encouraging in the extreme, for they are unsought, and the persons in joining do so because they are in sympathy with the Club's work and appreciate the advantages they receive from such membership. Within the last year there have been more than fifty such accessions to membership, while the Club has lost but ten through death and resignation.

The financial condition of the Club is constantly improving. Though the Bulletins published by the Club during the past two years have been very expensive, yet the Club is entirely out of debt, and the plan, which has just been inaugurated, of securing advertisements in order to help defray the expenses of publication, bids fair to go a long way toward paying for such publication. From present indications it seems entirely probable that eventually there will be a profit derived from this source.

The proposed outing of the Club to the Yosemite, Tuolumne Meadows, and High Sierra, to take place in July, is already an assured success, and is going to do more toward attracting attention to the Club and its work than any other single event which has happened during its

period of existence. Excursions of this nature will be made frequently in the future, and will become one of the most attractive features of the Club. The railroad, stage, and hotel rates which the Club has been able to secure for this summer's trip is the best proof of what the Club is able to do in this direction, and will insure to its members the opportunity for taking many wonderful and interesting trips in the future at a minimum of expense.

The Secretary's financial statement coincides with and is embodied in the Treasurer's report.

Respectfully submitted,

WM. E. COLBY,
Secretary.

TREASURER'S REPORT.

FROM MAY 5, 1900, TO MAY 2, 1901.

RECEIPTS.

Cash on hand May 10, 1900	\$ 432 44
Total cash received from Secretary	842 85
	<u>\$1,275 29</u>

EXPENDITURES.

Publications	\$ 515 90
Printing of circulars, notices, etc.	50 25
Postage and stationery	96 05
Room rent (11 months)	55 00
Clerical work and typewriting (11 months)	165 00
Public meetings	24 05
Yosemite headquarters	60 03
Distributing Bulletins	9 30
Incidentals	9 86
Cash on hand May 2, 1901	289 85
	<u>\$1,275 29</u>

Respectfully submitted,

J. N. LE CONTE,
Treasurer.

NOTES AND CORRESPONDENCE.

In addition to longer articles suitable for the body of the magazine, the editor would be glad to receive brief memoranda of all noteworthy trips or explorations, together with brief comment and suggestion on any topics of general interest to the Club. Descriptive or narrative articles, or notes concerning the animals, birds, forests, trails, geology, botany, etc., of the mountains, will be acceptable.

The office of the Sierra Club is at Room 45, Merchants' Exchange Building, San Francisco, where all the maps, photographs, and other records of the Club are kept.

There are but a few copies on file of No. 3, Vol. I., of the BULLETIN. The Club would like to purchase additional copies of that number, and we hope any member having extra copies will send them to the Secretary.

We are pleased to announce the marriage, on June 10, 1901, of Miss Helen Marion Gompertz to Mr. Joseph Nisbet LeConte. Both have been active members of the Club for many years, and have contributed toward the success of the Club by their active interest in mountaineering, and by their writings and photographs published in the BULLETIN.

NOTES CONCERNING A TRIP TO THE GRAND CAÑON OF THE COLORADO, MAY, 1901.

It may not be generally known how near in point of time the Grand Cañon of the Colorado is to residents of California, or how easily accessible are many of its most interesting features. The following notes concerning my second trip thither may be of some help to those who are not familiar with the ground covered.

I left San Francisco on the morning of May 21st, by way of the Santa Fé Limited, and reached Williams, Arizona, May 22d at noon. At 12:30 P.M. the one daily train of the Grand Cañon railroad started on its fifty-or sixty-mile trip due north, and before 3 o'clock we were at End of Track. End of Track is within ten miles of the "rim" of the cañon. Most of the passengers took the conveyances in waiting, for the Bright Angel Hotel, at the head of the Bright Angel Trail, or for the Grand View Hotel (or Berry's), at the head of the Grand View Trail. The Bright Angel Hotel is about due north from End of Track, and the Grand View Hotel lies to the northeast.

My own plans had been made, however, to visit on this occasion a more western section of the cañon, with headquarters at Bass Camp, otherwise known as Surprise Outlook, on the rim of

the cañon, some twenty-five miles west of the Bright Angel Hotel. Bass Camp is at the head of the Mystic Spring Trail, which leads down to the river in the cañon's depths. This trail is owned by Mr. W. W. Bass (whose post-office address is Williams, Arizona), who has lived in and about this section of the cañon for more than seventeen years.

Mr. Bass and one of his men, John Wallenturg, met me at End of Track with a four-horse team, and a steady drive of twenty-two miles across the desert brought us to Bass Camp at about 8 in the evening. The trip from San Francisco to the rim of the cañon had therefore occupied exactly thirty-five hours. About two miles east of Bass Camp, is Havasupai Point, whence a magnificent view of the cañon may be had. The recesses of the gorge for twenty-five miles to the eastward are laid bare, and to the west a vast amphitheater swings round to the north, inclosing a succession of stupendous cliffs and gorges. The opposite walls of the cañon are fifteen miles distant, and the river—now swollen to a raging torrent—cuts its way through the granite six thousand feet below. I spent a day exploring Havasupai Point, Fossil Knoll, and the adjacent heights. But I wish to speak particularly of the trip down.

THE MYSTIC SPRING TRAIL.

On May 24th, at about noon, accompanied by Richard M. Bleak, another of Mr. Bass's men, I started from Bass Camp down the trail for the river. (Mr. Bleak is an intelligent and satisfactory guide.) The trail begins at the very door of the cabin, and seated upon our burros we could follow the thin line of our path far below, until it was lost in the black shadows of the deeper gorges. The first plateau or level below us, marking the upper surface of the red sandstone formation, thrusts three huge jagged fingers out into the heart of the abyss. Of these the projection on the east, just below Havasupai Point, is called the Grand Scenic Divide; that to the west the Mystic Spring Plateau. In the center is the Le Conte Plateau, and it is upon the surface of Le Conte Plateau that our path leads before it disappears in the red sandstone bowl-ers of the cliffs below.

But we have been anticipating, for we must first put some 1,500 feet of yellow sandstone above us before we reach the red. The trail is good, though steep at the "staircase," where rapid descent is made among the crags and projections of a fault. Water is priceless throughout this region, and the tanks or cisterns—natural cavities in the gorge's rocky bed—which we pass just before reaching the "staircase," are of interest. Just below, and on our right, are some cliff-dwellings that repay exploration. The only trophies which I secured were some shreds of ancient pottery.

But in one of the dwellings I saw two poles whose ends seemed to indicate that they had been cut from the parent tree with axes of stone or flint. Other cliff-dwellings are to be seen in a neighboring gorge, my guide informs me.

At length we are on level ground once more—the level of Le Conte Plateau. On our left rises Huetha-wa-li, or Mount Observation, whose peak can be reached by a difficult trail. The dust of the plateau is red, the stones and boulders are red, and even the horned toads have taken on the prevailing color. Several mesquite pits are to be seen, where the Indians from time to time roast the roots of the mesquite. Pausing for a moment at the edge of one of these pits we picked up a fine arrowhead of obsidian, a broken spearhead of flint, and a piece of decorated pottery.

Soon our trail descends again, roughly and rapidly. Ere long the sandstone cliffs tower above us, and before we realize it we are in the shadows of Trail (or Marble) Cañon, with steep limestone heights closing us in to the right and left. Down, down our patient burros take us. Before long the limestone cliffs are behind us. Here to the left the trail to the Mystic Spring begins. The spring was revealed to Mr. Bass by Captain Burro, a Havasupai Indian, after years of ineffectual search.

The gorge which has been open for a space, narrows now, and rough walls of granite hem us in. Bedrock Camp, where we shall spend the night, is near at hand; but we press on, in order to view the river by daylight. At last the muddy torrent is reached. The snows are melting in the mountains of Utah, and my guide tells me that since his last visit the river has risen thirty feet perpendicular. Driftwood rushes by, and great trunks of trees forty feet long seem like matches in the current. Whirlpools seize them and suck them in only to vomit them forth again farther down the stream. A constant rumbling is heard, muffled, but menacing, and one can fathom the sound as huge boulders, submerged, grind their way along the river-bed. I am told that on occasion these boulders leap from the water like huge leviathans.

We have seen the Colorado River at its flood in its prison walls of granite, and that sight alone would repay us for all our toil. Reluctantly we turn away. Bedrock Camp, a mile and a half up the gorge, beneath a frowning cliff of granite, has a welcome for us—blankets, food, and water from a tiny spring caught in a rocky basin. Sleep follows a hot supper, and soon after daylight on the morrow we have started up the trail again, and by noon have reached the rim.

Bass Camp, I would say in conclusion, makes an excellent starting-point for the difficult but interesting trip to the so-called villages of the Havasupai Indians, far down in the Cataract Cañon, to the west.

W. A. BREWER.

FORESTRY NOTES.

EDITED BY PROFESSOR WILLIAM R. DUDLEY.

MEETING OF FORESTERS. The American Forestry Association will hold its summer meeting at Denver, Colo., on August 27th, 28th, and 29th, in connection with the annual meeting of the American Association for the Advancement of Science. This is the most important meeting of foresters for the year, and the leading papers will be on the relation of forestry to irrigation, on forest fires, and on the forestry needs in certain States.

ADVANCE IN NATIONAL FORESTRY. The question of the consolidation of national forestry work has not been one to excite popular interest, but in the minds of thoughtful people it has been regarded as by far the most important question in national forestry before the people. To put the matter briefly, all the trained foresters in the employ of the Government are in the Department of Agriculture, Division of Forestry; but all work of practical administration of the great Forest Reserves is being carried on by the U. S. Land Office in the Department of the Interior, and by the U. S. Geological Survey. No bill to consolidate was introduced into the last short session of Congress; but, according to *The Forester*, the Secretary of the Interior has said "there can be no question as to the desirability of a complete consolidation of the Government's forest work." Moreover, he has agreed to place in charge of the Forester, Mr. Pinchot, even before any Congressional action can be taken "the investigation and decision of all technical forest questions and the execution of resulting plans. *The Forester* believes that "no such stride toward the proper management of our public forest lands has been made since the act which authorized the establishment of national reserves was passed in 1891."

The appropriation to the Division of Forestry by Congress for the year 1901-1902 was more than double that of the preceding year.

In the reorganization of the scientific sections of the Department of Agriculture during the session of Congress, the Division

of Forestry was raised to a bureau, and after July 1, 1901, will be known as the Bureau of Forestry.

A very important step toward the creation of the National Appalachian Park or Forest Reserve is the cession by Tennessee to the United States of a strip of forest and mountain land, twenty miles wide, along the entire eastern border of the State; also by the States of North Carolina and Virginia of somewhat similar tracts of the Alleghanian region. As intimated in the January BULLETIN, the Pacific States can wish the Atlantic no better fortune than the creation of a great national park in probably the most beautiful hardwood forest region of the North Temperate Zone.

THE PROPOSED FOREST PARKS. The bill for the purchase of the Calaveras Groves of Big Trees passed the United States Senate, but failed to come to a vote in the House, largely through the open disapproval of Speaker Henderson. This is a lamentable outcome of a promising movement, for the Calaveras Big Trees are worthy the ownership of a great nation.

The Appalachian Park bill was not brought before Congress, but its prospects have been considerably advanced, notably by the action of the States above mentioned.

The Minnesota Forest Park, which should more properly be a State property than a National one, was not brought up for Congressional action.

The Big Basin Redwood Park bill, in our own State Legislature, received the favorable vote of 55 to 1 in the House, 30 to 2 in the Senate, and the signature of the Governor, in March, thereby becoming a law. It appropriates \$250,000, available in five annual installments, for the purchase of redwood timber land in the Santa Cruz Mountains for public park purposes, and provides for a commission of five to make the purchase. This act has attracted much favorable comment outside the State. The organ of the American Forestry Association says in an editorial: "In this act California has not only done a great service to the cause of forest protection in the United States, but has also given her citizens a superb park for the enjoyment of themselves and their posterity. The State may well be proud of the energy and public spirit which has secured the perpetuation of the Big Basin redwoods." There has been much vigorous work done by the organizers of the movement, but the almost universal sympathy it has met with is a matter worthy of comment. The various organizations peculiar to the State came warmly to its support, both political parties favored it in their platforms, college presidents worked for it, one of the most eloquent speakers in the State first visited the Big

Basin and then addressed the Legislature in its behalf, the press generally was favorable, and particularly the people and the press of Santa Cruz, Santa Clara, and San Mateo Counties were practically unanimously in favor of the park. Mr. Andrew Hill, the artist, who had charge of the general interests of the bill at Sacramento, probably more than any other active advocate, deserves commendation for his devotion. In all of this gratifying support there has been one influence coming out of the past which may have been more potent than any of us realize. During all of this Big Basin campaign the name of Ralph Sidney Smith, formerly editor of a Redwood City paper and a writer of poetry, has been frequently mentioned by editors, clergymen, lawyers, and others deeply interested in the park, as one who years ago fell in love with this forest, inaugurated and maintained his own campaign in favor of the preservation of its redwoods, enlisting much sympathy here, and also in the East, with such papers as the *New York Tribune*. Most unfortunately, a violent death cut short a career which must have been singularly full of those traits and ideals which captivate men of thought and feeling. That movement perished with him, but nothing is more evident to us who did not know him than the fact that he sowed that which grew in the minds of the present generation. For the sake of the California forests may this generation multiply it many fold.

THE REDWOOD RESERVATION ACT. Following is a copy of the amended Big Basin bill as passed by the Legislature and approved by the Governor:—

AN ACT—Providing for the creation and management of the California Redwood Park, making an appropriation therefor, and creating a board of five commissioners, with power to make purchases, and to manage said California Redwood Park.

The People of the State of California, represented in Senate and Assembly, do enact as follows:—

WHEREAS, The redwood forests of California are rapidly disappearing before the demands of commerce and the ravages of fire, and will shortly be extinct unless adequate means are taken for their perpetuation; and

WHEREAS, These trees are the oldest and largest in the world, and, being peculiar to California, contribute to her fame, and are naturally the subject of State pride and protection; therefore, it is enacted that

SECTION 1. The Governor of the State of California and four other commissioners appointed by the Governor shall constitute the California Redwood Park Commission, whose duty it shall be to select such land from that tract of land commonly known as the Big Basin, situate in Santa Cruz and San Mateo Counties, in the State of California, upon which are growing trees of the species known as *Sequoia sempervirens*, and which in the judgment of said

commission, is most suitable for a park, the purpose of which is to preserve a body of these trees from destruction, and maintain them for the honor of the State of California and for the benefit of succeeding generations. The commissioners appointed by the Governor shall hold office for four years. Vacancies shall be filled by the Governor.

SEC. 2. The sum of two hundred and fifty thousand dollars (\$250,000) is hereby appropriated out of any money in the State treasury not otherwise appropriated, which shall be subject to the control of said commission, but which shall be used solely for the purchase of land suitable for the park herein provided for; *provided*, that the said sum of two hundred and fifty thousand dollars shall be available only as follows: The sum of fifty thousand dollars (\$50,000) thereof on the first day of January, nineteen hundred and two; the sum of fifty thousand dollars (\$50,000) thereof on the first day of January, nineteen hundred and three; the sum of fifty thousand dollars (\$50,000) thereof on the first day of January, nineteen hundred and four; the sum of fifty thousand dollars (\$50,000) thereof on the first day of January, nineteen hundred and five, and the remaining fifty thousand dollars (\$50,000) thereof on the first day of January, nineteen hundred and six.

SEC. 3. The commission shall have the power to purchase such land or any portion thereof, or it may proceed by action at law in the Superior Court to condemn the same or any portion thereof, in the name of the people of the State of California. The commission may also receive contributions from any source for the purchase of additional lands, and the care and maintenance of lands and forests under its charge.

SEC. 4. The said commissioners shall have no salary, but shall have full power and control over the said park, and over the funds provided for the purchase and maintenance of the same, and shall make and enforce all necessary rules and regulations for the care, maintenance, and government of the same, and for carrying out the purpose of this act.

SEC. 5. No payment of any part of the said sum of two hundred and fifty thousand dollars shall be made until an abstract or abstracts of title shall have been furnished to the Attorney-General of the State of California, showing that said lands and the whole thereof are free from any valid liens or incumbrances thereon; and it is hereby made the duty of said Attorney General to examine said abstract or abstracts of title, and to render and deliver to said commission his opinion in writing, certifying that no valid liens or incumbrances exist thereon, and that the title of said lands and the whole thereof is good and valid. Said opinion of the Attorney-General, together with said abstract or abstracts of title, shall be filed in the office of the Secretary of State.

SEC. 6. This act shall go into effect immediately.

